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Personal Productivity:
The Role Of Prospective Memory
In The Management Of Commitments

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ABSTRACT

Several studies (see for example, Francis-Smythe, 2006; Macan et al., 2010) showed the existence of a connection between prospective memory (PM) and personal productivity (or time management, TM): the strategies commonly used to support prospective memory (e.g., business planning, prioritizing tasks, notes, to-do list) are the same used for time management. However, there are still little empirical evidence and gaps in the study of the effectiveness of the typical methods and technologies of time management to support this memory functionality.

The overall goal of this study was trying to provide a further contribute to the study of this connection through some empirical studies.

The first part of this dissertation deals with the traditional approach to prospective memory study. This will include the main definitions, theories and models of PM and the main areas of investigation arisen from the analysis of literature. The second part deals with the most recent approaches focusing on the connection between prospective memory and time management.

Based on the inputs identified in the literature, the third part deals with the empirical contributions to support this connection, identifying the most appropriate instruments to be used for the study of the phenomenon, evaluate their effectiveness, in some cases building ad hoc and propose new ones. Moreover, each study is introduced by the related theoretical contributions.

Finally, the last part deals with the general conclusions of all studies and the future prospective of research.

PUBLICATIONS

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TRADITIONAL APPROACHES TO PROSPECTIVE MEMORY STUDY

Usually, when we talk about memory, we refer to the individual's capability to remember past events. However, the memory also plays a prospective function: recover an action previously formed that can only be done in a specific moment of the future. This function of "remembering the future" is made by the prospective memory (PM).

Some studies about human memory highlighted, as prospective memory errors are more frequent than those related to retrospective memory. However, it was this last typology of memory to be mainly studied. The early studies on prospective memory can be traced only from the seventies, although the greatest increase of contribution shall be had only after the publication of the first book about the topic (Brandimonte, Einstein and McDaniel, 1996). Some authors (see -for example- Kvavilashvili, 1992) allocated the reason of this delay to the difficulty to find reliable methods to investigate the PM processes. One of the paradigms frequently used in this field of study was proposed by Einstein and McDaniel (1990) related to the administration of a processing task of verbal material which included an internal memory perspective task (usually press a button when a target word appeared). The biggest limitation of this method was that subjects often forgot to perform one of the two tasks. Kvavilashvili (1998) proposed an alternative method that, on the one hand, would obviate the limits of Einstein and McDaniel's method and, on the other hand, would allow the study of some methodological and theoretical variables underlying the method itself. These variables were related to the typology of prospective memory task (main vs. secondary) and to the awareness of the task of PM under investigation. The experimental task required to reading out loud a song and every time the word "prefect" appeared, substitute it with "detective" word (prospective task). There was three experimental conditions: in the first condition subjects were aware that the task of PM was studied, in the second, the subjects were aware that the task of PM was studied but the intention to replace the target word was not part of the main experimental instructions. The third condition was similar to the second, but without any information about the prospective task. At the end of the task was also a questionnaire loaded out to detect the degree difficulty, interest, involvement and availability perceived by subjects. The results of the study have shown how

individuals under the third condition (no indication on the prospective task) had a performance worse than in other subjects to experimental conditions. According to the authors, this result proved the goodness of the task used in the PM study.

INTENTIONS AND DISCRIMINANT STIMULI

Over the years, the prospective memory has been defined in many different ways: "remember what we do" (Neisser, 1982), "remember to do something at a particular moment of the future" (Kvavilashvili & Ellis, 1996), "realize delayed intentions "(Ellis, 1996) and as" the timely execution of an intention already formed "(Kvavilashvili & Ellis, 1996). Although several authors have provided different definitions of this construct, the common element is that the processes of PM are based on intentions.

According to some authors (see, for example, Brandimonte, 1991; Ellis, 1996), the prospective process is characterized by five stages:

Encoding phase: this phase requires the formation and encoding of an intent or decision to act, the action associated with that intent and the criteria or cues that specify when this action and intent should be retrieved

Retention interval: this phase is defined as the time interval between the encoding of intention and the beginning of the potential action;

Performance interval: the period during which the intention has to be recovered

Execution of intention: after having pointed out that something had to be done at that time and what had to be done (retrospective component), it begins to realize the intention

Evaluation: phase where the results are evaluated.

One of the first studies of prospective memory based on intentions was conducted by Loftus (1971). The author defined PM as the memory of intention, or the determination to act in a certain way or do a certain thing. Conversely to previous studies, according to which forgetting an intention was a different process than forgetting –for example- a series of stored syllables (retrospective memory), the author has proposed that the same mechanism would also be responsible for

forgetting intentions. In support of this hypothesis, the author conducted a study that investigated the influence of the presence of a recovery cue and the number of items presented on the probability that an intention to be remembered. These variables were taken into account because they were the same commonly used in laboratories for studying the failures of retrospective memory. In this study, the subjects were asked to participate in an opinion survey indicating, at the end of the questionnaire, the state there were born. Depending on the condition where subjects were assigned they have to answer five or fifteen questions and only half of them received a recovery cue to remind the intention. The results of the study showed as in the presence of the cue and few questions to answer, performance was better than the other conditions.

According to Kvavilashvili and Ellis (1996) the ability to carry out a prospective memory task would depends on how the intentions are considered in terms of encoding, storage and recovery proposing a classification. With regard to the coding phase, there are five type of intentions: 1) based on easy decisions which would require a reduced time of training, 2) based on hard decisions which would require more time for coding due to a new organization of activities, 3) inherent or born of individual's personal needs, 4) important or unimportant to reach a goal and 5) based on emotional aspects, according to an individual would tend to remember more easily those pleasant postponing all that may cause pain or fatigue. According to the authors, there are also intentions time-based: the intentions "pulse" would be remembered in a very short time interval while the intentions "step" in the longer time. Among them, there are those "intermediate" with intermediate time intervals.

With regard to the phase of storage, Baddeley and Wilkins (1984) divided it into short-and long-term intentions, arguing the time between the formation and retrieval of the intention to increase the complexity of the maintaining process action to execute.

Intentions related to the recovery phase were separated in time and events. According to Einstein and McDaniel (1996), time-based intentions require that the actions are executed at a specified time, through internal self-recovery strategies. In

contrast, the intentions based on events require recognition of an external cue that would feed it into the action.

It's possible, however, to consider the prospective performance in terms of functional analysis because much behaviour is selected according to their consequences. For example, we tend to do things that in the past led to a good performance. Although they were only the product of past consequences, the behaviour would be implemented because it could have similar consequences in the future. However, as stated by Skinner (1974) intentions are a "state of mind" or a "private event", but not behaviour. They can be found in the reinforcement contingencies (past and present) but not in people. For example, a person does not go to the bakery because he wants bread, but because he considers bread as reinforced by a previous behaviour to go to the store.

Investigating, therefore, the PM through the functional analysis might consider the prospective performance in terms of controlling and controlled behaviour (Skinner, 1953). That is, in a situation where behaviour is enacted because it changes the probability of occurrence of another behaviour, the first type is considered controlling, while the second would be the controlled one. In terms of performance prospective this would mean to control behaviour (action to be performed) should identify those discriminative elements that can reinforce the positive outcome. For example, if the goal (intention) is to write a text, you should identify those conditions that facilitate the issuance of those behaviours that create a cause-effect relationship between the behaviour itself and the environment.

TIME AND EVENT-BASED PROSPECTIVE TASKS

In general, the studies of prospective memory used as a method of investigation the paradigm of the dual task, or asking the subject to run simultaneously with the primary task, another task called secondary. A typical task of prospective memory is composed of five phases (Einstein et al., 2005):

1) Presentation to the participants of the instructions for the execution of the task and carry out some practical tests of the ongoing task

2) Presentation of the prospective instructions of the task

3) Introduction of a delay during which participants carry out other activities

4) Reintroduction of the ongoing task, without the presence of a reminder to the participants for the prospective task.

5) Presentation of the prospective cue during the ongoing task and measurement of performance through the proportion of time that participants took to remind to perform the task.

According to Brandimonte (2004), a task of PM should always possess three fundamental characteristics: 1) delay between the formation of intention and the opportunity to do it, 2) the absence of a reminder to execute the intention at the appropriate time and 3) the need to interrupt the current task to realize the intention.

The prospective memory tasks were distinguished by Einstein and Mark Daniel (1996) in event-based and time-based tasks. In the first tasks, the remembering of the action to perform is encouraged by the presentation of an external stimulus (cue) that supports or guides the memory. The latter, on the other hand, needs to remember to perform an action in a specific instant or after a certain period of time. In contrast to event-based tasks, in time-based tasks there is no external stimulus that facilitates the memory. The next section will explain with more details the two different types of prospective tasks and some of the methods used for their study.

Event-based tasks

In the analysis on the event-based tasks, Einstein and McDaniel (1996) have considered some tasks as structurally similar to those of retrospective memory excepting for in these latter is an outside agency that invites to start a search mnemonics, while prospective memory tasks require that the subject spontaneously recognize the event as a stimulus target for performing an action. The hypothesis of the authors for this type of prospective memory tasks assumed that a success would depend mainly on the facility of identifying the target event. According to the authors, the properties of events could affect the performance in such tasks. By the results of some laboratory studies, they have been formulated two models of how the cues in the environment may remind the subject to perform an action. These models were: the simple activation model and the model Search+Notification.

In the simple activation model, when a subject is engaged in a prospective memory task, it would form an associative encoding between action and the cue. Later, while performing other activities interveners, the activation of the encoding cue-action would pass to a level not aware. This sub-threshold activation would tend to dissipate over time unless there is additional activation as a result of exposure to the event target, or thoughts triggered internally, on the activities to be carried out. With the decrease of activation, would decrease the likelihood to reactivate prospective memory to an aware level when the event target appears.

The two-stage Search+Notice model concerned the ways where the intention would be recovered. The model assumed that whenever an individual encounters a potential target event, this would provide an automatic sense of familiarity (notification) that may require a more conscious memory (research) to determine the significance of that event. Therefore, the prospective memory includes two stages: a stage of notification (or feeling of familiarity) and a research phase. According to this model a good prospective memory depends on the success of these processes of direct search.

Both models argued that there are different classes of variables that can influence prospective memory: 1) the nature of the event target, 2) the processing type and extent of this event when the target encoding, 3) the length and nature of retention interval, 4) the test and the type of processing and 5) the magnitude of the processing of the event target. According to the models presented, the activation of the prospective memory, or notification of the target, could be more likely when the event target is included in the ongoing task than when it is presented in peripheral tasks. In addition, the nature of the ongoing task would affect the prospective memory: tasks that require high processing resources, make it less likely that the occurrence of the target is notified, or make it more difficult to activate the cue for the execution of prospective task.

Both models focused on the spontaneous recall of the characteristics of the prospective task. However, they differed in the processes of recovery: whereas the first model was based solely on automated processes, the second one took both processes, aware and automatic.

Time-based tasks

The characteristic of a time-based prospective memory task is that the appropriateness of the action is determined by the passage of time rather than the occurrence of an event. An experimental task often used to study the performance in such tasks was, for example, write something to the experimenter on a particular day or remember to call him at a specific time. However, due to lack of control that was possible using with this methodology, subjects could change time-based tasks in tasks based on events using evident external cues as reminders for the action to take.

A specific model for this type of work was developed by Harris and Wilkins (1982). This model, called Wait-Test-Test-Exit (TWTE), was based on the possibility that subjects evaluate the appropriateness of time to perform the action. If not, individuals would establish a waiting period that should elapse up to the arrival of the subsequent item and re-evaluate whether or not it is the opportune time to perform the action. This cycle would be repeated until the subjects do not consider the time as appropriate to execute the action. According to this model, a memory of success depends on the monitoring or control during a critical period of time: a process that seems to be mainly self-activated. Harris and Wilkins suggested that subjects, who failed to monitor the passage of time, generally have a poor performance in time-based prospective tasks. Although this model was considered a valuable contribution to the study of performance in time-based prospective tasks, it did not provide any indication of the underlying cognitive constructs that caused the behaviour of time monitoring.

THEORIES AND MODELS OF PROSPECTIVE MEMORY

The analysis of literature showed as an important role in prospective memory is occupied by the possible interference between the prospective task and the ongoing task. In particular, such interference would occur when it becomes necessary to shift attention from the ongoing work towards identifying the cues that are necessary for the execution of the intention. Different experimental contributions have been provided about this topic that have sought to investigate the nature of this shift in attention from one task to another one. An approach argued that the shift of attentional resources was a voluntary process mediated by a supervisor attention system (SAS; Shallice and Burgess, 1991). According to this approach, the SAS monitor the environment to identify the target event and report the appropriate time to perform the action and, once detected the cue, may stop the ongoing activities to execute the intention. On this monitoring process there were not provided many details, however, several authors have suggested various ways where this might happen. For example, Smith (2000) argued that some resources executive could be continuously used to monitor the environment or to identify markers associated with intention. According to Guynn and colleagues (2001), however, the executive system periodically would mind the intention, maintaining activate the association between the cue and the action, so it is easier to activate when the target appears. Regardless of these processes to occur, the key assumption is that some attentional resources would be used deliberately to consider strategic environmental events and/or periodically bring to mind the intention. In support of this assumption, Smith (2000) used the performance in the ongoing task as an index that attentional resources are required during a task prospective. The author has noticed that when subjects were given instructions for the prospective task, even when the prospective target was not presented, the time to perform the task were significantly slowed compared with ongoing trials where no instruction was provided. The explanation given was that the attentional resources were allocated during the prospective phase to evaluate the events compared to the prospective task, thus reducing the resources needed to perform the task ongoing.

A different approach argued, however, that when an event target is identified it puts in place some processes that automatically remember the intention (McDaniel et al., 1998). These processes could be supported by a system of involuntary associative memory that reported to a conscious level the information that previously associated with the environmental stimulus. This system was supposed to support the memory when an external stimulus is automatically interacting with the intention previously encoded. If the cue was sufficiently good, the associative system quickly and with few cognitive resources, led the information to a level of consciousness associated with the cue. The idea behind this approach was that in the event-based tasks there was no strategic monitoring of the cue. According to this approach, in the presence of unfamiliar stimuli it obtained a prospective performance better that in presence of familiar stimuli: because an unfamiliar target it would have little associations, would be higher the probability that the presentation be put in place the processes of association that lead the intention to a conscious level that allows the execution of the action.

They were, however, other approaches proposed by which the prospective performance does not depends on strategic attentional processes or automatic processes. According to these guidelines, in PM tasks would also intervene age-related variables (a more detailed discussion on this topic will be provided later). However, among the different studies proposed (see, for example, Einstein et al., 1990, Cherry and LeCompte, 1999) there is a strong discrepancy between the results.

Based on studies conducted over the years on prospective memory, McDaniel and Einstein (2000) have proposed the "Multiprocess Framework Model" as a theory to explain the different results obtained by different authors. According to this theory there exists a set of processes based on both strategic and automatic that could affect prospective memory. The purpose of the model was to identify those factors that describe the range of contexts where prospective memory is involved and shed light on cases where the performance depends on strategic processes or on more automatic and unconscious processes. These factors included the ongoing importance of the task, the properties of the cue, the characteristics of the ongoing task, planning and individual differences.

Regarding the first factor, Kliegel and colleagues (2001) have shown the existence of a relationship between perceived importance of the ongoing task and performance prospective. Manipulating the instructions, or giving a greater emphasis on the prospective task, there was a less accurate performance than when the same prospective task was presented as more important than ongoing. Even Winograd (1988), according to a social prospective, suggested that individuals are most likely to remind the prospective task when the others consider as important that task. Interpreting these results with the multi-process model, tasks that are considered more important would favour a strategic control to ensure better performance. In contrast, tasks that are less important -because the strategic processes require more effort- it would put in place relatively more automatic processes.

The second factor that can determine the nature of attentional processes put in place for the recovery of the intention, it was referred to the nature of the event target. According to the model, so you can record a good prospective performance, the cues should be uncommon, distinctive compared to the current context, and salient in some features. Also the association cue-intention was considered important to the performance. In particular, a high association between the two elements would require the intervention of automatic associative processes: studies in this direction (McDaniel and Einstein, 2000) showed better performance compared to situations where the association was less high.

The third factor presented in the multi-process model referred to the characteristics of the ongoing task. In particular, if the execution of the task requires a core processing of the prospective cue (that is included in the ongoing task), it is sufficiently processed to ensure an automatic retrieval of the intention. Conversely, if the cue is not part of the set of information that can be derived from the ongoing task, the prospective memory would require more strategic attentional resources to monitor the cue and report the appropriateness of the cue to execute the intention. The ongoing task could also affect the performance prospective depending on how many resources are needed for its execution. In general, an ongoing task that requires a significant amount of resources should have a negative effect on prospective memory when conditions require a more strategic approach (for example, when the target is not distinctive).

The fourth factor, it would seem that the type and level of planning might influence the degree to which it can refer to automatic processes for the success of the prospective task. For example, a good planning could help to prevent a strategic control, thus requiring the subject to the investment of fewer resources. In addition, it would seem that some conditions require less planning than others, for example, in cases where targets presented are very salient.

The degree to which they put in place strategic and automatic processes in prospective task may depend, according to this model, also by the individual differences. For example, according Goschke and Kuhl (1993) subjects with a particular personality profile may prefer to monitor mainly the intention than those with a different type of profile. In particular, subjects with a personality state-oriented, that is more inclined to ruminate on the actions, could maintain active the intentions for a period of time longer than those with a personality action-oriented profile. In fact, the results of their study showed that subjects more state-oriented kept their active intentions regardless of whether the intention was elicited by a cue external or self-initiated. In contrast, action-oriented subjects showed a greater level of activation only when the intentions required self-activated processes. In general, these results showed that some personality types than others would be more sensitive to the specific demands of the task and modulate their prospective approach to the task according to their characteristics. Although yet few studies have been conducted on the influence of these factors, according to the multi-process model, it could be argued that the effects of personality traits would be most evident when it is less likely that the planning and recovery conditions require an automatic recovery.

The Multiprocess Framework Model is one of the main analysis patterns of the prospective behaviour. However, because of its focus mainly based on the automatic recovery processes, this model over the years has been questioned. The Preparatory and Attentional and Memory process (PAM theory; Smith, 2003), contrary to the multiprocess framework, proposed that the prospective component would never be automatic, assuming that a successful recovery of an intention might be only in the context of processing resources. This process, called attentional preparatory, would include some level of non-automatic monitoring of the environment for the occurrence of the event target. Consequently, the recovery of an intention would be

never automatic because the non-automatic preparatory processes would be committed during the interval performance or when it is more likely to present a good time to perform the action, but anyway first the presentation of the event target. Consequently, the inclusion of a prospective task in a ongoing task would reduce the resources available for this event, even when the target is not yet been presented. More specifically, the function of these processes would facilitate the recognition of a given event as a target for the intention, in addition to, or instead of, any other interpretation placed on the perception of that event. In some cases, these processes may occur in the attentional focus and be fully aware as an explicit and strategic management for the occurrence of the target. In other cases, they could operate outside the attentional focus on the threshold of awareness. A good prospective performance would require that the preparatory attentional processes should be implemented, that is a certain amount of conscious processing should be devoted to the preparation of an alternative response to the ongoing task. According to PAM theory, these processes cannot be in focus attentional but still require conscious resources.

More recently and based on the results obtained from studies that have considered the PAM theory as a reference model, it was proposed the first formal model for the study of prospective memory in event-based tasks: the Multinomial Process Tree (MPT; Smith and Bayen, 2004, 2005). As described above, a prospective memory task also includes a retrospective component. However, through studies conducted so far has not been yet identified how the manipulated variables affect each of the two components. The purpose for which the MPT model was formulated was to identify the contributions of the preparatory attentional processes that are put in place before the presentation of the event target, and those of the retrospective memory that, instead, occur at the time of appearance of the cue. The MPT assumes that there are cognitive states that people reach with a certain probability during the execution of the task: these probabilities are presented as parameters of the model that are estimated by the method of maximum likelihood. However, a necessary condition for the application of the model is the use of prospective tasks that include ongoing tasks with two types of tests and two possible responses (four conditions). The validation of this model was made through a series of experiments where the importance of the

task was manipulated, the distinctiveness of the target and the difficulty of encoding cues presented. Although the validation results have suggested that the MPT may provide a valuable contribution to the study of prospective memory, yet few studies have been conducted in this direction.

MAIN AREAS OF INVESTIGATION OF PROSPECTIVE MEMORY

The analysis of the literature has identified two main areas of investigation of prospective memory: one linked to the influence that the aging processes can have on performance and other linked to the influence of certain characteristics of the stimuli. However, partly due to the delay of the importance of studying this memory function, the two areas often overlap in terms of contributions.

Aging and prospective memory

Several studies (see, for example, Kvavilashvili et al. 2001; Passolunghi et al., 1995) have shown that already by the age of four years an individual is able to perform prospective memory tasks. Zimmermann and Meir (2006) have tried to outline a course of performance of PM tasks throughout life, conducting a study where a sample of children between 4 and 6 years, adolescents aged 13 and 14 years, adults between 19 and 26 years and between 55 and 65 years old and between 65 and 75 years was used. Subjects were given an ongoing task that required to keep pressing the "shift" key with the index finger of his left hand and pressing the "B" or "M" with the right index finger when the pair of pictures that were observed was the same or different. For the prospective task it was asked to press the "shift" of the ongoing task and press the "Y" with the same finger every time the screen was presented a picture of an animal. The results has shown a trajectory of an inverted U curve shaped indicating an increase in the prospective performance that ranged from children to adults and then decline in the elderly. These results have led the authors to consider how skills in the PM would follow a pattern similar to that of retrospective memory.

One of the first studies to investigate the influence of age on the PM performance tasks was conducted by Dobbs and Rule (1987). The sample consisted of subjects aged between 30 and 99 years. Participants were asked to undergo an interview, warning that at the end they would be asked to draw a circle and a cube. The prospective memory task consisted in having to remember to ask for a red pen to draw the figures required. After twenty minutes into the interview a sheet of paper and a pen was placed in front of the subject and asked to draw the figures. The performance was considered correct if the subject remembered to ask for the red pen.

The results showed a poor performance in the task of prospective in those older than seventy years, while the performance was close to perfect for the young subjects.

Further work on age-related decline in prospective memory was conducted by Einstein and McDaniel (1990). In a first experiment the subjects were asked to perform a task of short-term memory where there was included the task of PM to press a key on the keyboard every time the word "rake" (three times in the whole task) appeared. In addition, some subjects were given the opportunity to create external aid to remember the task, while others did not provide any cue recovery. At the end of the task they were asked to fill out a questionnaire where subjects had to report the value of how many times they thought the task of PM during the overall duration of the test. The sample consisted in two groups of subjects: one aged between 17 and 24 years and one aged 65 and 75 years. The results of this study showed no effect of age on the performance prospective. Although there was, however, a main effect in the condition where cues were present, there was no significant difference between the two groups of subjects. Based on these results, the authors conducted a further study to investigate the role of the cue in the prospective task. The assumptions on which this second study based, was that a good performance in the PM was due to both having to remember to perform an action that need to remember to do it at the appropriate time. According to the authors, common and familiar stimuli could interfere with the performance because of pre-existing associations, as opposed to those uncommon and unfamiliar stimuli. In other words, an idea associated with an event has greater probability that the event would be recovered inefficiently. However, this influence does not necessarily led to better performance. The task used was the same as the previous experiment except that subjects had to press a key in the presence of familiar words, others in the presence of other cues that were not familiar. The results have shown similar results of the previous study. However, although there was no such significant influence of age on the prospective memory task, the results supported the hypothesis that uncommon and unfamiliar stimuli produced better performance in terms of correct answers. According to the authors, this result was due to both the absence of pre-existing ideas associated with the stimulus presented that, and in the absence of interference, could

enhance recall of prospective, and the distinctiveness that the unfamiliar target could have in respect to the others target presented.

With the aim to investigate the role of task characteristics on performance, Einstein and colleagues (1992) conducted a study where the task was manipulated by increasing the time between instruction and the beginning of the test (maximum 15 minutes) and varying the number of prospective target that were to be responded. The sample used was composed of young people aged between 19 and 24 years, and adults aged between 60 and 80 years. The subjects had to perform a task of short-term memory where was included a task of PM which was to press a key on the keyboard every time the target was presented. The experimental conditions for a group of subjects included the identification of one target word, for the other group four words. In addition, one group began the prospective task after a short interval from the instructions and the other after a longer period. The results of this first study did not show an effect respect to the interval between the instructions and the task and a marginally significant effect of age. In particular, no differences were found between the two groups in the condition with a target word, and have shown better performance of young subjects compared to adults in the condition with four target stimuli. This result was replicated in a second experiment where the condition that was used were only four targets.

With regards to the distinction in time-based tasks and event-based, Einstein and McDaniel (1991) have suggested that a possible effect of age on performance was mainly located in the first type of tasks, due to the involvement of a greater amount of processes self-activated that, as known, decrease with advancing age. To provide empirical support to this hypothesis, the authors conducted a study where subjects (young and adults) were asked to press a button every ten minutes. The results confirmed the hypothesis of the authors.

The study of the influence of age on performance in prospective memory tasks and of the role that can have the type of target has long been the subject of numerous studies. Mäntylä (1994) conducted a study to investigate the presence of differences in prospective memory using a task with high demands for self-activated processing. The sample consisted of subjects aged between 20 and 33 years of age

and adults aged between 65 and 78 years. The prospective task required subjects to report the code associated with event targets belonging to specific categories previously stored (the targets could be either typical or atypical) every time they heard the cue. According to the author, atypical targets within a semantic category would have required a greater degree of self-activated processing than typical ones. Moreover, he expected an effect of age on performance. The results showed that manipulating the typicality of the targets influenced the prospective memory, that is, atypical target produced a higher number of failures in both groups of subjects. In addition, it was shown that the increase of age differences were accentuated as increased requests for self-activated processes and how these differences were not only related to the temporal dimension of memory prospective (when) but also to the content (what). The discrepancy between these results and those obtained by Einstein and McDaniel (1991), was explained by the author as due to the diversity of the stimuli used. In the experiment of Einstein and McDaniel, in fact, the used words were very typical and then demanded a few self-activated processes that would not have revealed age-related differences.

Based on results obtained by Mäntylä (1994), Einstein and colleagues (1995) conducted a study assuming that the probability of age-related differences in PM tasks occurs when are required self-activated recovery processes. The studies were performed with tasks both time-based and event-based. In the time-based condition it was used a sample of young people aged between 18 and 21 years old and adults between 61 and 78 years. The prospective task required pressing a key on the keyboard every 10 and 20 minutes during a memory task. For the execution of the task, there was given a digital watch to monitor the passage of time. This instrument was positioned so that the subjects had to turn around to watch it. The results showed an effect of age on performance: the young people had a better performance than adults. With regards to the number of times that the clock had been inspected, the results showed that young people monitored the time more often than adults in the vicinity of the target time assigned. In a second experiment there was, instead, used an event-based task and manipulated the degree of specificity of the event target: specific word (tiger, lion and leopard) vs. a generic word (animals). Also in this study there was used a sample of young (18-27 years) and adults (60-78 years). The

subjects had to press a button when the appropriate target word appeared. In agreement with previous studies (Einstein and McDaniel, 1990), in this type of work, there were no differences in performance between young and adults. With the aim to investigate whether the absence of this effect was due to the type of prospective task used, the authors conducted a third experiment where in the time-based condition the subjects were asked to press a button every five minutes, in the event-based condition when a question on the president appeared. The ongoing task for both conditions consisted of a series of questions of general knowledge. Compared to the two previous experiments, there were also changed other characteristics: 1) in the in time-based condition, the clock was placed on the screen because the run could be exhausting for adults, 2) there was added a group of average age (35-49 years), and 3) it was increased the cognitive load, that for half the duration of the experiment subjects had to only answer the questions, for half the remaining time had to understand an audio message. The results showed only an effect of age on performance in time-based task: adults had a worse performance than the other two groups of subjects. To investigate the cause of this effect the number of times where they had been watching the clock was examined. As in the previous experiment, the clock was watched just before the target time, and this behaviour was particularly strong in young people and in those belonging to the group of average age. This result was explained by the authors on the basis of the theory test-Wait-Test-Exit (TWTE) of Harris and Wilkins (1982) whereby the time monitoring entails to see if it is an appropriate time to perform the task (T), if isn't wait (W), monitor again (T) and if it is the right time to perform the action (E) and Craik's theory on self-activated recovery processes. Being these latter influenced by the advance of age, a worse performance than the other two adult groups could be attributed to the deterioration of these processes during TWTE since there was no external cue that would help the recovery of the intention. Regarding the manipulation of cognitive load was not found in this study effect on performance and - in general-on any other variable.

In a later work, Einstein et al. (1997) have attempted to investigate in more detail this last result, with particular reference to attentional demands. The task used for this purpose required to some subjects to perform more than the basic task, the

listening to a voice message. According to the authors the results should show a decrease in the efficiency of encoding, a non-recovery of the intention at the appropriate time or reduced processes at all stages of prospective memory. In a first experiment, the average age of young participants was 19.43 years, while adults 72.97 years. The results showed that in the prospective task young people have had a better performance and how, by increasing the attentional demands, decreased prospective performance. In a second experiment, the authors wanted to replicate the results previously obtained by the elderly looking also to identify which aspects of prospective memory were more difficult, or if performance worsened at the time of encoding or retrieval. The results showed a significant effect of age on the recovery phase: adults have reported a worse performance. Referring to the self-activated process, an explanation for these results was that in situations where there are strong demands in the ongoing task, the adults had at their disposal sufficient resources to handle the demands of a self-activated retrieval of the prospective task. In contrast, when high demands were made in an ongoing task, the limited resources made the recovery more difficult and also recorded the worst performance.

A further study to investigate the existence of a relationship between age and prospective performance was conducted by Park and colleagues (1997). The purpose of a first experiment was to determine the influence of age by manipulating the number of event-based tasks that must provide an answer. The sample was composed of young men with a mean age of 19.21 years and adults with a mean age of 69.77 years. The ongoing task was to present a series of words and at the occurrence of a particular target word (6 target words used together) subjects were required to list out the last three words before the onset of the target word. For the prospective memory task two conditions there were created: one where the target words were six and another where they were twelve. Subjects were instructed to press the number "zero" when the target word appears (a total of 6 times in the first condition and 12 in the second). The results showed an effect of age on the prospective task. In particular, younger participants had better performance than adults. Because such influence occurred when was presented only the prospective task, this result was explained as due to the complexity of the task (along with ongoing and prospective). Contrary to the first experiment, the sample used was composed of young men with a mean age

of 19.59 years and adults with a mean age of 68.8 years. The ongoing task used was the same as the previous experiment, while the prospective task was to pull a lever every minute or every two minutes during the ongoing task. For the monitoring of the time, the subjects had a clock that was activated from them directly every time they decided to monitor the elapsed time. Again, the adults had a worse performance than younger people. Were given four possible interpretations for this result: 1) as due to limited resources of processing of the adults, 2) as due to lack of vigilance towards the task of prospective, 3) referring to studies by Einstein and McDaniel (1990) and Einstein and colleagues (1995), as due to the difficulty to inhibit irrelevant information from the ongoing task and 4) as due to improper use of strategies that could enable the joint execution of ongoing and prospective tasks.

Subsequent studies have provided further evidence on the influence of age and complexity of the ongoing task on the prospective performance. d'Ydewalle and colleagues (2001) used a sample of young people and adults, respectively, with an average age of 20 and 69 years of age. In the ongoing task, subjects were presented the result of an arithmetic operation described previously, asking them to press "Y" if the answer was correct or the "F" otherwise. The complexity of the task was determined by the presentation of operations between one and three digits. While subjects calculated the formula, was performed the prospective task: press "Y" if the result would begin with the number 5 (event-based) or when the clock behind them marked 1, 3, 4, 6 and 9 minutes (time-based). The results showed a main effect of task complexity of obtaining more correct answers in the presence of simple operations (one digit) and how this effect was particularly evident in time-based tasks. Another significant result was obtained by looking at the overall execution time of the task, where adults were more slowly than younger people. Based on these results, the authors suggest that adults may have shown a poor performance in time-based tasks because the ongoing task used the same central resources as the prospective.

As you can see, the studies presented thus far have focused on the processes of recovery in single tasks of PM. However, for most of the daily tasks of prospective memory, the intentions to run are often repetitive (such as, for example, take a medicine at a certain time). Some variables, that could affect performance in these

circumstances, have been identified in the management of internal sources (for example, confuse the need to take the medicine with the thought of taking it) and temporal discrimination (consider taking a drug such as occurred recently further back in time) (Johnson and Raye, 1981). Einstein and colleagues (1998) have attempted to investigate the influence of these variables on the performance prospective. In addition, the role of the presence of cues and divided attention in these processes it was also investigated. Individuals, in fact, perform the prospective tasks while engaging in other activities. However, with the habit, some of them become more automatic and attention are divided between the other tasks to perform. According to the authors, this division of attentional resources could lead to a greater number of errors. To investigate these issues, a study using a sample of young people with an average age of 19.8 years and adults of average age of 70.73 years it was conducted. The prospective task required participants to press a specific button every three minutes. In the condition where the cue was present, a note bearing the words "remember to press the button" was positioned next to the button. In circumstances where they investigated the role of attention divided, subjects heard a sound every two seconds and whenever they heard two consecutive odd numbers they were to press a button. The results have shown that in habitual PM tasks there was a decrease in performance related to age. In particular, in the initial tests (before the task becomes habitual) the main difficulty was to remember to perform the action, while in subsequent trials, subjects had difficulty remembering if they had already performed the action and for this they committed more errors repetition. This result was particularly evident in conditions with high attentional demands, where in the early stages of the task a 42% of omissions was made as well as 12% of repetitions, while in the latter stages there were 16% omissions and 42% of repetitions. In particular, if the adults did not respond because they thought they had already provided an answer, then the omission could be attributed both to the management of internal sources (the subjects would have thought the answer before the appropriate time and then you have given thought to having performed) and temporal discrimination (the subjects would remember an answer given in a previous trial and thought it was the current test). An interesting result of this study was that the presence of the prospective cue was associated with the increase in omissions,

especially towards the end of the task for adults. The presence of external cues may have led adults to put excessive trust in the cue rather than relying on an internal strategy. This result was particularly evident with omissions relating to having thought to have already performed the task. According to the authors, the presence of an external cue may have increased the focus on the prospective task in that in turn would increase the confusion between memory and action in the management of internal sources.

Cherry and LeCompte (1999) took into account, in addiction to the age, the influence of individual skills on prospective memory, or the level of education, intelligence and processing of verbal resources (working memory capacity). The sample was composed of young people with low and high individual skills (respectively, with mean age of 18.6 and 20.6 years) and adults with low and high individual skills (respectively mean age of 70.5 and 68, 8 years). The ongoing task used was based on short-term memory, while that prospective required subjects to press a button whenever it was presented to them a word target that for half of the participants were “boat” for the other half “dress”. The results showed that age and personal skills can affect performance in prospective tasks: the chance to respond properly to the PM task was similar for the group of young people and adults with high skills. Different results were obtained when comparing young adults with lower skills, where the latter showed a worse performance than adults. Overall, these results have also stressed the importance of using an approach based on differences in individual abilities to study the performance in prospective tasks in adulthood.
It can happen that an intention cannot be performed when it is recovered but must be retained until the opportunity presents itself to execute it. Einstein and colleagues (2000) conducted a prospective study to investigate the performance and the influence of the age factor when the intended action should be postponed after recovery in the PM. For example, in a task-recovery execution (press a button when you see an event target), the individual would form the intention to perform the action when it appears the event target, would keep going during the retention interval and the intention would recover when it encounters the event cue. Further delay for the execution of the intention (task-recovery delay) should be a further prospective task for which you need to rerun the above steps. According to the

authors, the performance the second type of task should be worse in adults. As previously reported in some studies (see, for example, Einstein et al., 1997, Park et al., 1997), increasing the demands of the ongoing task (working memory) would reduce the prospective performance in adults. According to the authors, manipulating the demands for working memory, it would provide in the recovery-delay condition a worst performance in adults. For this purpose it was introduced a delay of 30-39 seconds between the occurrence of the target and when to perform the action. To match the difficulties in the ongoing task, the stimuli were presented to the elderly fewer target and more slowly than those for young people. The average age of the young and adults were respectively 19.4 and 68.7 years of age. The ongoing task used required subjects to read a statement and answer some comprehension questions. To equalize the cognitive demands between the two groups, young people had to answer two comprehension questions after reading the statement for 13.5 s, while the adults responded to a question after a single administration for 18s. In the condition without delay, the subjects were asked to press the designated button each time they were presented the words "technical" or "system", in contrast, in the condition with delay subjects had to press the button when it began the next part of the task. For investigating the role of divided attention, in some condition was presented a sound containing digits. The subjects had to press a button when listening to two consecutive odd numbers. The results showed an influence of the divided attention only in the condition with delay where deterioration in performance was particularly evident in the group of adults. For investigating the reliability of this result, the authors conducted a second experiment where the duration of the delay was increased. The sample consisted of young people aged between 19 and 25 years old and adults between 60 and 87 years of age. The procedure used was identical to that of the previous experiment, but varied the conditions of the task: 1) free short-delay where there was no activity took place, 2) short delay busy with other activities 3) free long-delay and 4) long delay busy. The results showed a better performance in the young, although no differences were found between the two types of delay. With respect to adults has been, in particular, noted a rapid decrease in performance after a short delay, probably due to the salience of the target (the word in capital letters). To further investigate this result, a third experiment was conducted

maintaining the same procedure used in the first but by reducing the salience of the target in such a way as to make it harder for prospective. The sample consisted of adults with a mean age of 69 years. The results showed, first, a significant decrease in performance in the divided attention condition in presence and absence of delay, confirming as the results of the second experiment were due to the salience of the event target. Another result showed that, when the initial recovery is more difficult, the adults would be more sensitive to the difficulty of retaining in memory the intentions for short periods of time, but should have better performance in the presence of a longer delay where they could make use of control mechanisms to sustain the attention. West and Craik (2001) investigated in particular the role of four factors on the decrease in the performance of PM tasks related to age. The factors taken into consideration were referred to the ongoing task characteristics, to the characteristics of the target, to the accuracy of responses and to the cognitive resources used to perform the task. For this purpose two experiments were conducted in the first case using a sample of young men with mean age of 22,55 years and adults with mean age of 69.48 years, in the second case consisted of young people and adults with a mean age of respectively 19.25 and 71.88 years.

The results showed that: 1) the decrease in PM corresponded to an increase of errors of omission, 2) there was the presence of an interaction between type of processing required in the ongoing task and the characteristics of the prospective cue, although this interaction moderated the magnitude of age-related differences, 3) the time required to provide a correct prospective response was greater for adults, indicating an age-related decline in the accessibility of the cue, and 4) the effects of age on prospective performance were generally mediated by differences (always age-related) in the processing speed of stimuli and control of inhibitory processes.

All studies presented so far have been conducted in a laboratory where it was possible and easier manipulating and to controlling some variables. However, the results often are poorly generalizable in real daily life. This has increased in recent years the interest to study the performance in prospective memory tasks in naturalistic settings. On the other hand, early studies on the relationship between this particular function of memory and aging processes were carried out precisely in such contexts showing opposite results than those conducted in the laboratory. One

possible explanation for this discrepancy was explained by some authors (see, eg, Rabbitt, 1996; Rendell and Thomson, 1999) as due to the possibility of using external devices, to the lifestyle and motivational differences of the participants, to differences in task used and the predictability of the occurrence of the event target that elicits a memory prospective.

In this regard, Rendell and Craik (2000) conducted a study to investigate the contradictory trends of the age between laboratory and real tasks. In a first experiment they used a board game designed in order to virtually reproduce the days of a week. The game was called Virtual Week and was composed of a series of boxes representing the hours of the day from 7 to 22 on which the persons moved by throwing dice.

At the beginning of each round, participants extracted a card that indicated the day of the week and two PM tasks that had to be performed for that day. The available cards were selected to provide a logical sequence of tasks representing activities such as phone calls, visit from neighbour, shopping, going to library, watching television, session at university, house cleaning, baby-sitting, going out in car, seeing a movie, going to a swimming pool/sports club and visit by repairman. The sample consisted of young (19-24 years), adults (61-73 years) and elderly (75-84 years) who were asked to record any activity taking place and its implementing rules. Each virtual day contained ten prospective tasks divided into four regular, four irregular and two control of time. The regular tasks included two event-based tasks (taking an antibiotic for breakfast and dinner) and two time-based (taking a drug for asthma at 11 and 19). The irregular tasks include phoning a plumber, putting gas in the car and returning a library book. As with the regular tasks, the irregular tasks are both time-based and event-based. The results of this study showed a drastic reduction in performance in the virtual task by the elderly despite their motivation to successfully perform the task and the apparent inclusion of everyday real-life structures. In addition, there was found no interaction between age and event-based tasks and, contrary to previous studies, even those time-based. The worsening performance was particularly evident in the regular tasks, explaining as the discrepancy with previous studies of laboratory could be due to the fact that they have typically employed tasks irregular. To investigate whether it could be possible to achieve the same effects in a

real context, the authors conducted a second study, using the same sample of subjects, called "Actual Week." As in "Virtual Week" the subjects were asked to perform ten tasks of prospective memory in a week. Again, the participants not performing actually the task but recorded on a portable recorder equipped with a time-stamp. The event-based tasks used were real-life activities of individuals and the same for the whole sample (lock back door when you put on shoes and/or coat for going out; close curtains when switching the lights on in the evening; check you have some small change when having lunch). An important recommendation for participants was not to use under any circumstances support any kind. The results showed a better performance of the two groups of adults in regular and irregular tasks and adults in the checking time task. In addition, all participants showed better performance in event-based tasks than time-based, but no interaction was found with age. Based on the results obtained, the authors concluded that: 1) the difference between laboratory and real-life tasks does not seem to be simply due to greater use of external support by older peoples in naturalistic tasks, 2) if the greater structure of daily living in older adults is a factor, it is either not a strong factor or does not generalize to parallel laboratory tasks, given the poor performance of older adults on Virtual Week, and 3) the distinction between event and time-based tasks is also not crucial for resolving the paradox, apparently, given the absence of age-related interactions with this factor in both experiment. Consequently, the explanation for this discrepancy may depends on the nature of ongoing task (set by researchers versus the participants' real life) and the time span (up to an hour or so versus several days). Typically laboratory PM tasks are confined to time periods of less than one or two hours, whereas naturalistic PM tasks are usually spread over several days. This alternative view involves the rather general suggestions that younger adults were superior on Virtual Week because they can maintain a set of PM intentions over the short term, provided that they are motivated to do so and that no other important tasks intervene.

As a conclusion of the series of studies presented in this work, we can say that the negative influence of age on prospective memory has been particularly identified in laboratory studies, by contrast an advantage related to this variable it can be found in naturalistic studies. The superiority of adults in this type of work would be due to 1)

a greater experience with time management, 2) the knowledge of fallibility of their memory, 3) the presence of a few distractions, 4) a more efficient use of prospective cues, 5) a greater opportunity to plan how remember to perform a task and 6) the characteristics of ongoing task e time span used.

It's also possible to say how the age-related differences are most likely found in time-based PM tasks. As discussed above, there are different variables that could be considered as possible mediators of the effect sizes of age related to this type of tasks. Among those most investigated, the level of verbal intelligence (Cherry and LeCompte, 1999) and the level of effort required by the ongoing task (Einstein et al., 1997) would seem to be those with greater influence.

Prospective memory and cue

One of the variables that can influence the prospective memory has been identified in the presence of a cue that, by acting as a remainder, would facilitate the remembering the action to execute (Loftus, 1971). Consequently, a good performance in tasks of PM depends on the target event can trigger the action (McDaniel Einstein, 1993). Recent studies (see, for example, Einstein and McDaniel, 1990, 1993) have shown that manipulation of the type of the cue could have a marked influence on performance. In particular, Einstein and McDaniel (1990) showed how unfamiliar or unusual events target would be able to produce a better performance compared to familiar target. This result was due to the absence of previously formed ideas associated with the target that might interfere with the prospective remembering. However, the main purpose of this study was to investigate the influence of age on the performance prospective and, although it was a valuable contribution, has only provided an indication of the role of familiarity of the cue in tasks of this type.

In 1994, Brandimonte and Passolunghi have replicated the study of Einstein and McDaniel (1990) specifically investigated the effect of familiarity and distinctiveness of a target event on the prospective performance and the role of the length of retention interval. As distinctiveness, the authors intended the occurrence of familiar item within an environment consisting of only non-family item or of unfamiliar items within a context of familiar items only. Five experiments were

conducted with the same material and the same procedure except for the effects investigated. The experimental procedure consisted of an ongoing task of short-term memory and a prospective task where the subjects were asked to press a specific button when the target word was presented. The purpose of the first experiment was to investigate the role of familiarity and distinctiveness of an event target and the length of retention interval. In the prospective task, the subjects were asked to press a button when it appeared the word "home" and "chrism." To manipulate the retention interval, half of them began the task immediately after receiving the instructions, while the others after six trials where event the target never appeared. The results showed a better performance in the presence of the distinctive and familiar target when the test was performed immediately after receiving instructions. If these results could be generalized with regard to familiarity, was different for the distinctiveness because of its multiple nature (e.g., semantic, colour, perception, etc.). To investigate this aspect more specifically, in the second experiment the distinctiveness was further manipulated by presenting the target in uppercase within a set of words in lower case (distinctive condition) and vice versa. The results for the familiarity and delay were the same as the previous experiment. With respect to distinctiveness, however, better performance was recorded in the presence of the target perceptually distinctive (upper/lower case) than distinctive semantically (category of membership). The results from these first two studies showed different results compared to the condition "delay" of studies where Einstein and McDaniel did not find any effect of this variable on performance. According to Brandimonte and Passolunghi, this discrepancy could be, for example, in part due to the length of the interval (15 to 30 minutes by Einstein and McDaniel, and 3 minutes in this study) whereby which only a short period of delay should manifest an effect, and was described as "waiting for an event" in part. That is, the knowledge whether or not the presentation of the event target during the test session. The role of this information in prospective tasks was investigated in the third experiment, where half the subjects were informed that during the tests could have been training up the target word, the other half this information was not provided. The results showed no difference between the two conditions. Another hypothesis for the discrepancy between the results was related to the similarity between the activities presented during the delay

period and the prospective task. Based on this assumption, in the time of delay of the fourth experiment, half the subjects were in fact carried out the arithmetic task, while the remainder were represented the training tests. Given the lack of difference also in this case between the latter conditions introduced, a fifth experiment was conducted assuming an influence in the performance of activities with higher or lower attentional demands for the execution. To do this, in the condition "delay" were introduced four variants: the role of the practice in MBT, wait for the experimenter, counting aloud from 1 to 10 until they were stopped by the investigator and perform a motor task. The results showed, in this case, as deterioration in performance is manifested in the presence of tasks with high attentional demands and of activities that required the use of the motor system. These results were interpreted as an index that the processes of recovery in the PM consist of repeated internal simulations of the action that people expect to run at the time of the test.

In 1996, Mäntylä based on a series of previous studies, described a performance model of PM where the success in an event-based task would depends on the contribution and interaction of three general components: 1) cue-dependent concerning aspects of the cue that can affect performance, 2) trace-dependent related to the level of activation for the action to be performed, and 3) capacity-dependent based on the individual's limited attentional resources. The method used to evaluate the first component concerned the manipulation of the typicality cue, showing the influence of this characteristic on prospective performance (Mäntylä, 1993). The component trace-dependent described the degree to which the performance is affected by operations that modify the activation level of the representation of intention in the MLT. The manipulation was done to investigate this component based on the concept of priming. The author had presented, before the formation of intention, a semantic category to only part of the subjects to investigate the differences in performance with the subjects who were not exposed to this presentation. The hypothesis was that, in the presence of priming, the detection of the targets event was supposed to be easier. The results have confirmed the hypothesis, showing a better performance in case of priming, supporting the idea that the trace-dependent variables could affect the PM (Mäntylä, 1993). Regarding the third component, several studies have shown conflicting results. In some cases, increasing

the demand of attentional resources had obtained the worst performance, in other cases this effect was not demonstrated. A few years later, Penningroth (2005) has replicated the studies conducted by Mäntylä that led to the definition of its model. In this study, the author has manipulated the typicality of the cue, the priming of the categories and the quantities of resources required to perform the task. The ongoing task was a task of free association. To study the effect of typicality were used four target groups: vehicles, birds, plants and clothes. For each category, was presented a cue typical of the category (e.g., bus, robin, carrot and shirt) and one atypical. For the capacity-dependent component were created two conditions: one where during the ongoing task subjects had to remember the last two words heard and repeat it when the experimenter stopped the tape (high demand condition) and one where this change was not present. The effect of priming, however, was inserted by the subjects perform a task where the experimenter gave four categories and the subjects had to bring on a sheet as many cases as they could in a minute. Of the four categories presented only two were then used during the experimental task. The prospective task required subjects to mark on a paper an "X" each time they listened to a word of four specific categories were barely uttered. The results of this study showed that only the typicality and the attentional demands had influenced the performance. In particular, the typical cue was identified more easily than the atypical and the performance was worse when the ongoing task required a large number of attentional resources. It has not been found, however, none effect of priming, if not dependent on other two variables. The results of this study in part confirmed those obtained by Mäntylä (1993) except for the effect of priming. Penningroth argued that this discrepancy could be due to the fact that in his study had been used only one of the four categories used by Mäntylä and that the semantic categories chosen were not adequate to show the effect of the prime. The results of this study can be considered important for their practical implications: for ensuring a good performance in event-based prospective tasks, it may want to use cue highly typical.

Another factor that can influence the encoding of the target could be the specificity of the instructions provided (Ellis and Milne, 1996): providing a particular event as opposed to its category of membership would lead to better performance. As reported in the previous section of this review, already Eintein and colleagues (1995)

had investigated “the effect of specificity” in the relationship between aging processes and PM. However, in that study was shown no effect on the prospective performance of these characteristics. According to Ellis and Milne, specifically when a single cue is encoded, its re-presentation at the time of the test would favour a match between encoding and the retrieval making easier a correct performance. However, presenting more specific cues on the retention and the subsequent recognition may take the influence of relationships between them. These relationships, moreover, could also affect the “goodness of copy” that is their typicality. In support of these considerations, the authors conducted an experiment where replicate the effect of specificity used by Einstein and colleagues (1995) and investigating the role of possible relationships between the cues. With regard to instruction, according to the authors the recognition of an item as valid for recovery, should be easier when the cue at the time of the coded instructions and one presented in the test phase are identical. In this way it would be the right matching that would allow a good performance. In the case of this study, the specific stimuli used were names of animals and the animals category in general, also taking into account the relationship between the category and the sample. The authors hypothesized that when a single specific cue was coded, its representation in the test could potentially facilitate a direct match between encoding and retrieval by allowing the execution of the intention. In contrast, when cues were presented to general practitioners, the subject would form different representations of which some may look similar to the target and thus affect the performance because of an overlap between items. The experiments conducted in this study consisted of two main conditions: the condition of specific instructions, where the words presented in the cue-encoding phase consisted of names of animals and the general instructions condition, where participants were told simply to provide the answer every time they encountered a component of the category “animals”. The cue-words presented in the trials were the same for both groups except for that the participants in the second condition did not provide precise information on which to base mental representations that they would, according to the hypothesis, facilitated the recovery of the intention. In addition, there was added two conditions by manipulating the semantic link between items. In the condition of high connection between the items, were presented the same stimuli

belonging to the subcategory of the broader category “animals”. For example: robin, canary and song thrush (subcategory of “birds”). In the low of connection condition between the items, this latter were selected from among the members of different subcategories of the higher-order category of “animals” such as: cat (“mammals”), snake (“reptiles”) and crocodile (“amphibians”). According to the hypothesis, by virtue of the specificity, the best performance in the condition of specific information should have been recorded in the presence of highly connection with each item. This hypothesis was based on the theory of hierarchical categorization of representations according to which the name (label / tag) of a category actives mental representations of a number of different subcategories and their specimens (Collins & Quillian, 1969; Rosch, 1975). This pattern of activation would vary depending on the number of specimens that are expected to appear in the form of critical items in the test phase. So the benefit in terms of general information would have to be better in the condition of items not related to each other (members of different sub-categories) because is reproduced the same method of hierarchical organization, increasing the likelihood of correspondence between items presented to the test and item expected. The ongoing task required the subjects, after reading a few passages of a story, to press specific keys whether the statements presented on the screen correspond to the truth or not read in the story. After this phase, the prospective task was introduced: pressing a specific key whenever the target word appeared in the condition they were assigned. The results of this first experiment showed better performance in the presence of specific cues and highly interconnected. In a subsequent experiment, was investigated the potential influence of the typicality of the cue in determining the effect of specificity in the presence/absence of items strongly associated. The experimental conditions were identical to those used in the previous experiment. However, in this case, intermediate categories have been added or names of subcategories within the general condition. By this manipulation, the authors expected to observe a more reliable effect of the specificity of general instructions whether on the condition of higher-order categories or that one of the subcategories in the presence of atypical rather than typical items. The results of this experiment showed that in the presence of an unusual target, the effect of specificity would seem to be influenced by the trend towards an improvement in performance under specific

conditions and deterioration in the general ones, than when using typical items. In general, the overall results achieved in the experiments, the authors were able to conclude that in the presence of a high association between the cue would increase the connection between cues activated under specific conditions, increasing the degree of support for these items whether in the encoding process or recovery. The opposite, however, would happen in condition of general instructions where such association would help a little support to these two phases of the prospective process.

Another feature of the cue that could affect prospective memory is the frequency with which a target event is presented (Ellis et al., 1999). According to the authors, when the cue-event frequency is relatively high, but remains a constant length of the ongoing task, the interval between presentations is very short and so an event-cue will be kept more active with periods, however, more short for the de-activation between presentations. In addition, a recovery and an effective performance of an occurrence would increase the strength of association between a target event and an action, reducing the likelihood of erroneous recalls on subsequent presentations of the cue. Based on these statements, the authors expected a worse performance in the presence of a high rate of presentation of the cue. The experimental session consisted of two ongoing tasks: a task of reading aloud and one of semantic judgment. The experimental task, however, required to replace in the task of reading the word "prefect" with "detective", while in the semantic task every time they encountered the word "ship" had to read it aloud. All subjects were subjected to four conditions. The results of this first study showed a better performance only when the event target was inserted in the reading task. However, the performance in these conditions was worse in the second half of the task in the presence of a high frequency of the target. In a second experiment, the authors have tried to improve the worst performance showed in the previous study, decreasing the frequency of presentation of the target event (word "detective"). The results showed the absence of a main effect of frequency. In general, it was shown as in this study changes in the frequency of presentation of cues did not affect performance when the prospective task was included in a reading task. To different conclusions, however, can be reached by referring to the judgment semantic task, where it manifested the worst performance. The authors have concluded that, using semantic ongoing tasks, it would be

appropriate to present a higher number of cues for achieving an effective performance.

In the studies illustrated above, the prospective cue was presented in the focus of attention in such a way that the stimulus was processed in the ongoing task that contained it. Some authors (Hicks et al., 2005) have focused on whether specific characteristics of the prospective cue such as, for example, the salience could facilitate the recovery of intentions. For this purpose, have manipulated this feature in the cue included in the focus of attention and compared with a similar manipulation of the cue presented outside the focus. The two conditions described above were obtained in the first case, telling participants that the intention to remember was to respond to the red words in the ongoing task, and in the second case that the intention was to respond to the red border around the words. The salience of the cue was manipulated by changing the size of the board and the size of words. The authors predicted that the same manipulation of the salience of the cue would increase the probability of recognition when it was found out of focus and not when it was part. The results confirmed the hypothesis: when the prospective cue is presented in the parts of the environment who were already receiving a lot of elaboration, their probability of detection was not significantly affected by changes in their characteristics. By contrast, the cues that were presented at the peripheral level of attention had a greater influence to trigger the remembering because the manipulation performed directed a larger amount of resources toward them.

The manipulation of salience was also carried out by Smith and colleagues (2007). The purpose of this study was to investigate the influence of this feature of the target event on the performance by referring to the two main theories of prospective memory outlined above. The first experiment was designed to investigate the effects of a PM task included in a lexical decision ongoing task where subjects had to indicate whether the presented text was or not a word. The study consisted of two conditions: one where subjects had to press a button each time it had a red word in the ongoing task and one where it had to press a button when a specific word appeared. This design was used to compare the effects of prospective task on that ongoing when subjects were expecting or not the presentation of the salient target. The results showed that the addition of the prospective task had deteriorated the

performance in the ongoing task, suggesting that even when it used a single target perceptually salient, the prospective task was not automatic. In the second experiment of the nature of salience was the semantic. The procedure was the same as the previous study except for the target event that, in this case, was the name of the subject. Also in this case, the results showed that the prospective task was not automatic even in the presence of a semantically salient target event. The third experiment, as well as to replicate the results obtained in the previous two, was to assess the cost associated to the prospective task when it met all the criteria of automaticity of McDaniel and Einstein's model. In this case, subjects were presented in each trial four coloured rectangles (blue, green, red, white). After the fourth rectangle appeared a string of "x" that, in a condition could be one of the colours of the rectangles presented (match trials), in another condition of yellow (non-match trials). The subjects had to press "Y" or "N" if the colour of the string corresponded or not to one of the colours of the rectangles. After completing the first block was introduced the prospective task that required you to press "P" if they encountered a string of "x" pink. This letter was chosen to increase the likelihood of an association between encoding and targets for action. Also in the third experiment, only the control group to respond significantly faster in the second block, suggesting that in the presence of a single salient target, a focal task, a simple action and a good association between cue and action, the prospective task of was not automatic. However, according to the authors these results could be due to the load associated with the remembering of the target and action. For investigating this possibility, it has conducted a fourth experiment where have changed the instructions for the control group in order to have the same load for both groups: remember the pink colour and the phrase "P-key". As in previous experiments, the control group showed faster response times to the second block. The results of this experiment have shown how the results obtained previously were not due to the mnemonic load. Based on the data presented, it is easy to see how this study has provided further confirmation of the PAM theory (Smith, 2003) whereby a good recovery of intention requires conscious resources. In particular, the resources would be used by the preparatory attentional processing whose function is to plan the disposal of the stimulus current

in the intention: a process necessary to recognize the opportunity to execute the intention.

Recent studies have investigated the possible influence that the number of cues presented could have on performance. In a recent study, Cohen and colleagues (2008) examined the influence of the size of the set of cues by analysing the effects of interference with the performance in the ongoing task. The size of the set of target events was manipulated by employing seven conditions, respectively one, two, three, four, five and six cues, more the control condition (no PM-task). Subjects were presented a series of letters and they were asked to press two specific keys if those letters forming a word or not. Subsequently, some of them were included in the control group, to others was presented the prospective task where it was asked to press a button when it appeared the target word or target words (depending on the condition assigned) previously stored. By the analysis of the results on the performance in the prospective task did not show a significant difference in the different conditions showing, contrary to the hypothesis, that the manipulation of cognitive load did not influence the accuracy of answers. Also in the performance in the ongoing task, there was not interference with prospective memory task in the condition with a single cue. However, significant costs were recorded in the presence of three or more cues. The authors explained the result in the condition with a single cue as due to attentional resource allocation strategies that the subjects would have formed before the execution of the task. According to the authors, the number of cues to process affected these strategies. More specifically, a large number of prospective targets in the task would bring the subject to strategies by which they would split their attentional resources between the ongoing and prospective task. These strategies also would be formed at the time of the instructions and automatically: if the intention was codified in the form “if....then” it created a link between a specific cue and a specific response that was re-activated automatically at the moment of appearance of the cue without further processing. In the case of multiple cues instead, given the greater complexity of the task, would not be possible to activate automatic processes of resource allocation, bringing the subject to having to build different strategies.

Another aspect more recently investigated was the affective valence of the cue (Clark-Foos et al., 2009). Some authors have handled this feature by assuming that positive and negative valence items influence performance in tasks of prospective memory by virtue of their power to evoke memories of pleasant or unpleasant situations. According to the authors, the value of the cue may affect the realization of the intention in two ways: 1) if the cue attracts more attention than it could be developed more broadly increasing the likelihood that the intention to respond bring to the mind, 2) the reaction of an individual to the value of a target event necessarily lead to the creation of other thoughts by acting as a temporary distraction, and generally reducing the detection of the cue. From the results it was possible to note that, in general, neutral and positive value of words led to a greater proportion of identifications of the cue in respect to target events with negative value. In particular, the results showed that words like “pain”, “tornado” or “beetle” and the thoughts associated with them was reminded more often than words like “puppy” or “happiness”, interfering more with the processes underlying the remembering of intention. This effect was explained by the authors assuming that the load greater than negative associations of items divert attention from the task of prospective memory, hindering the recovery of the intention and thus causing a general decrease in performance. From a practical point of view, these results would suggest to using variables to isolate the prospective memory from their potentially harmful effects of their affective valence.

In conclusion, it’s possible see how the study of variables that could influence the performance of event-based PM tasks, in recent years has seen a remarkable development. Studies have generally shown that the detection of the cue might be, for example, mediated by the strategies of allocation of attentional resources in place at the time when the cue is presented (Marsh et al., 2003). According to this hypothesis, if are used high resources for the ongoing task, only a minor amount would be available to detect the target. By contrast, in situations where few attentional resources are directed to the ongoing task, the event target would be easier to spot. Previous studies (see, for example, Marsh and Hicks, 1998, Marsh et al., 2002) present in the literature have shown how to divide attention with an additional task than the ongoing and prospective, could have adverse effects on

detection of the cue, suggesting that the target would require identification of the event of an optimal level of resources available. In addition, ongoing tasks that require the investment of executive power may reduce the performance of event-based prospective memory, particularly in people with compromised resources such as, for example, the elderly (Cherry and LeCompte, 1999). Another attentional factor that would influence the detection of target event may be what that West and Craik (1999) have called "momentary lapses of intention", which would operate when attention is directed elsewhere by the ongoing task containing within it the prospective task. A typical example of this effect is when, while performing a task, we have independent thoughts that it diverts attention from its execution.

RECENT APPROACHES TO PROSPECTIVE MEMORY STUDY

PROSPECTIVE MEMORY AND TIME MANAGEMENT

Planning is an activity that is part of the daily life of the individual. Many people, in fact, plan activities to be performed during a day, a week or a month. In addition, we also plan how to perform these activities, to achieve own goals by dividing them into a series of steps or subtasks to be completed in sequential order. In general, planning has been defined as a mental strategy used to determine future actions and facilitate the achievement of an objective (Gollwitzer, 1996). Goals and plans can vary in their hierarchical organization, the degree of specificity for the target and to the extent they contain information on how to act. All these characteristics influence their effectiveness in achieving the purpose.

One of the most reliable definitions of the concept of planning has been provided by Gollwitzer et al. (2004) by which is meant for planning the sequence of actions, strategies, time allocation and organization of resources relevant to the task can provide the implementation intention.

Several studies highlighted the connection between planning and prospective memory (Rabbit, 1996, Marsh et al. 1998; Kliegel et al., 2000). For example, participants in a study by Marsh and colleagues (1998) reported how their daily prospective activities includes some form of planning. In particular, they would form a plan, would keeping in mind and would perform each step-by-step action to achieve the desired objective. In general, planning and prospective memory include the representation of the situation, establishing the expected results, the decision to plan or act, evaluation of available resources and limits, the creation of a plan, implement and monitor the plan and review of results (Friedman et al. 1987; Scolnick and Friedman, 1987, 1993).

The planning is also a central element of the construct of time management, that is, that set of techniques to manage and plan the time (Macan, Shahani, Dipboye, & Philips, 1990, Burt & Kemp, 1994) can help the individual to achieve their objectives (Hall & Hursch, 1982). In the relationship between prospective memory and time management, this latter stands as a strategy supportive for this type of failure.

At present there are still few studies that have investigated explicitly this relationship. In this direction are certainly the contribution of the meta-analysis by Francis-Smythe (2006) and empirical contribution offered by Macan and colleagues (2010).

The purpose of the proposed contribution by Macan and colleagues was based on the assumption that individuals with good memory skills prospective and retrospective would have to bring good skills of TM and, in contrast, those more prone to failures in prospective memory abilities should have shown the worst of TM. The study was based on a correlational approach. Subjects were given two of the most common tools for measuring the behaviour of Time Management (TMBS: Macan et al., 1990, and TSQ: Bond and Feather, 1983) together with the PRMQ (Smith et al., 2000) that investigates the prospective and retrospective memory processes. The results confirmed in part the initial hypothesis by showing the existence of a strong relationship between TM and the specific aspects of prospective memory, especially as regards the set goals and priorities and have a preference for an organized approach to projects and work environment.

The Francis-Smythe work was among the first to explicitly address the relationship between TM and PM. The author has shown, in fact, the strategies commonly are used to support the PM (e.g., business planning, prioritizing tasks, notes, to-do list) are the same used for time management. In his work, the author has presented the different aspects of the construct of TM focusing on how they can contribute to the knowledge of this relationship. For example, the most obvious commonality between the two constructs is the use of external support (alerts, logs, etc.) used to avoid anxiety or stressful situations that might arise in the management of daily activities. The author also took into account factors that may influence the use of techniques of TM as a strategy against the failures of the PM. For example, important was the ability to accurately estimate the time: a good time management would require, in fact, the ability to plan a program to follow that estimate in advance the time required to perform each activity. Similarly with regard to PM, remember to do something at the right time requires the same degree of estimation and monitoring of the time. Another aspect has been identified by the author was the fallacy of planning that is the tendency to believe to complete a task before how much you really do.

According to the author this type of error would be due to the fact that people often do not consider the whole of sub-activities that make up the entire task. In other words, individuals make that which Gollwitzer (1993) has called "implementation intentions", that is for ensuring that action is completed successfully, it is necessary that individuals form a plan (in fact implement the 'intention) that determines where, when and how the behaviour should be implemented to achieve the goal. More generally, it would be like passing the control of behaviour by the individual to the environment. Another important aspect in the relationship between PM and TM is related to procrastination, or delay the execution of an action at another time. There is a wide literature on procrastination: various definitions have been proposed, outlined the distinctive features, etc. In general, although there were still no specific studies on the relationship between PM and this behaviour, the author hypothesized that the degree of procrastination could influence the ability to perform an action at the appropriate time. Therefore, the use of strategies of TM may be useful as a support to the PM especially those defined as other procrastinators. In conclusion, the main contribution of this work is that the use of TM may be appropriate strategies for 1) to release a certain amount of cognitive resources to be allocated to another task reducing thus the overhead of event and 2) to compensate for the failures of the PM.

It's easy, therefore, perceive that there is a significant connection between prospective memory and time management: through the knowledge of the mechanisms that facilitate the recovery of an intention (previously formed on the execution of tasks) we could identify the best strategies for planning actions for an effective performance.

CONCLUSIONS

Prospective memory failures are very common: “forget” to call a friend the next day or fail to turn off the phone before an important meeting are typical examples. Kliegel & Martin (2003), in a study to investigate the importance of the survey on prospective memory, asked some students of an educational institution for adults, to report the three most important problems of memory that they had during the last week. The results showed that 62% of respondents stated that one of them related to the memory of things that should be conducted in the future.

If in some cases, errors of this type have very minor consequences for the individual, in others it can be catastrophic. Two illustrative circumstances are taking medications by the elderly and, more striking, the suture in a patient leaving foreign objects such as tweezers and gauze by a surgical team. The consequences of errors in the PM may also have a significant impact on the lifestyle of people compromising the effectiveness and efficiency of staff and creating a high degree of embarrassment to forget, for example, an important appointment.

Reason (1990) in his book on the human error claimed that “the failures of prospective memory ... are the most common form of human fallibility”. However, the majority of prospective memory errors that occur in the workplace critics are not the result of the negligence of workers, of neglect or carelessness and who make mistakes of this kind does not necessarily mean it is a bad person. People who are conscientious make many mistakes, but in contexts that are characterized as challenges for the human cognitive system. Thus, the knowledge of cognitive demands underlying the errors of prospective memory becomes necessary to increase the security environmental in critical business situations.

To avoid errors of the PM or to remember to perform an action in the future, individuals put on different types of strategies: records, preparation of lists, the famous handkerchief knots, appointments on the phone, etc. However, few studies have been published their effectiveness (and most of them have used samples of elderly subjects or with particular cognitive deficits). Among them is possible to trace the study of Groot and colleagues (2002) that investigated the effectiveness in the record of events or actions that should be conducted in future. Doing to two

groups of subjects (non-disabled and cognitively impaired) four time-based prospective tasks and four event-based, it was noted that participants who had taken note of the instructions for the execution of the tasks had a better performance, in terms of correct responses than made those who had not used any instrument of record.

More recently, technological development has made it possible to design the electronic prospective memory aids (such as, for example, phones with calendars or PDAs) can also retrieve the retrospective component. These devices report the event at the right time (PM) and show the contents of the action to be performed (RM). However, also in this case problems arise in prospective memory that address the interaction between people and technology, and little has been studied on the strategies and tools that are used to avoid such errors.

EMPIRICAL STUDIES

Several studies showed the existence of a relationship between prospective memory and time management. However, there are still little empirical evidence provided and there are still gaps in the study of the effectiveness of methods and technologies typical of TM to support this function of memory. The identification through the analysis of the literature of the elements that the two constructs have in common, that is activities planning and the use of external supports, provided a broad opportunity to intervene for improving the prospective process using these methods.

On the basis of contributions identified in the literature, the aims of this research were:

- Adapting the Italian version of TMBS to investigate the behaviours of time management
- Building a tool for investigating the effect of using a planning tool, based on the use of contexts, on the performance
- Studying the effectiveness of the contexts in projects implementation
- Investigating the relationship, if any, between the error proneness and the use of TM strategies
- Building a questionnaire on behavioural markers of personal productivity
- Investigating the relationship between prospective memory and time management

For this purpose, the research has been divided into several stages, which allowed first identifying the most appropriate instruments to be used for the study of the phenomenon, evaluate its effectiveness, in some cases to build ad hoc and propose new ones. The following sections illustrate the studies that have characterized this work.

Study 1: Time Management Behaviour Scale: the adaptation to the Italian language (TMBS: Macan et al., 1990)

The Time Management Behaviour Scale (TMBS) is the tool that, more than others, showed reliability in the measurement of the behaviours aimed at improving personal productivity and time management abilities. The scope of this study was the adaptation of the TMBS for the Italian population, as well as the assessment of its psychometric properties.

The TMBS was created by Macan and colleagues (1990) for measuring time management behaviours. Unlike others questionnaires that mainly employ the individual assessment on the efficiency of TM behaviours, the item of this scale has been developed with the intention to measure how people effectively implement such typology of behaviours.

The first version of the questionnaire had consisted of 76 item based on tips, techniques and hints reported in several books that commonly are used in the time management training programs. Setting goals and priorities, avoiding accepting new commitment, making to-do list, are typical activities proposed in these programs. After some reassessments and analysis mainly made with students sample, thirty-four item compose the final version of the questionnaire. The same analysis had identified four principal components: 1) Setting goals and priorities, refers to setting of goals that the persons wants or need to accomplish and prioritizing of the various tasks to achieve this goals, 2) Mechanics of time management refers to behaviours that typically are associated with the time management as making to-do lists or planning, 3) Perceived control of time reflect the extent to which one believes he can affect how time is spent and 4) Preferences for organization referred to a general preference for disorganization in one's workspace and approach to projects. Perceived control of time would seem to be the most predictive dimension of better performance greater job and life satisfaction, less role ambiguity, less role overload and fewer job-induced and somatic tensions (Macan, 1990). However, in a subsequent study (Macan, 1994) the author pointed out that the dimensions related to "Setting goals and priorities", Mechanics of time management" and "Preference of organization" would seem mediated by "Perceived control of time" and don't have

any direct effect on the behaviour, questioning the existence of a significant relationship between the perception of being able to manage their time and job performance. Particularly, time management behaviours would seem to be in place if the individuals have the perception to control their own time.

In any case, since the validity showed by the original version and considering the absence of similar tool in Italian language, it was decided to proceed with its adaptation and exams of their psychometric properties. The following sections show the validation process carried out.

Method

Subjects. The questionnaire was administered to 305 subjects aged between 18 and 67 years (mean age=29; SD=10,9; 204 female) belonging to different professional categories. Particularly, the sample was made up of 209 college students (mean age=23; 167 females) and 96 between freelance and employee (mean age=42; 37 females).

Materials and procedure. Subjects completed the 34-item Italian TMBS by rating each statement on a five-point Likert scale that range from rarely (0) to very often (5) referring to their experience in school or work. The translation of the item had made through a back translation procedure and the final version showed substantial conformity with the original version.

Data analysis and Results.

With the aim to validate the Italian version of the TMBS, the analysis made by Macan et al. (1990) on the original version it has been replicated for this version. Particularly, we employed the Principal Component method extracting four components that accounted for 38,9% of the total variance with a Varimax rotation. The following table shows the saturations of the four factors.

	Components			
	Stabilire obiettivi e priorità	Meccanismi di Time Management	Preferenze per l'organizzazione	Controllo percepito del tempo
1. Sento di riuscire a fare un lavoro migliore se rimando i compiti che non mi va di fare, piuttosto che provare a farli in ordine di importanza	-,065	-,251	,329	,164
2. Il tempo dedicato a pianificare e organizzare la mia giornata lavorativa è tempo sprecato	-,104	-,287	,410	,267
3. Tengo un diario delle mie attività	,158	,651	-,206	-,008
4. Prendo appunti per ricordarmi quel che devo fare	,065	,751	-,109	,017
5. Definisco obiettivi a breve termine per quello che voglio realizzare nel giro di pochi giorni o settimane	,440	,346	-,001	-,243
6. Trovo difficile attenermi a un programma perché gli altri mi distolgono dal mio lavoro	-,141	,141	,218	,474
7. Quando noto che contatto frequentemente una persona, archivio il suo nome, indirizzo e numero telefonico	,107	,455	-,142	-,079
8. Quando faccio una lista di cose da fare, a fine giornata l'ho dimenticata o messa da parte	-,132	-,166	,323	,393
9. Riservo parte della mia pianificazione giornaliera per eventi che si verificano con regolarità	,466	,025	-,258	,400
10. Passo in rassegna le mie attività giornaliere per capire dove spreco tempo	,572	,106	-,086	,061
11. Riduco I progetti complessi e difficili in compiti più piccoli e maneggevoli	,440	,065	,253	-,053
12. Quando decido di portare a termine un compito, mi assegno delle scadenze	,526	,275	,045	-,269
13. Se so di dover passare del tempo in attesa, porto con me qualcosa su cui lavorare	,417	,266	,222	-,227
14. Sottovaluto il tempo necessario per completare un compito	-,104	-,128	,285	,526
15. Nel portare a termine le mie attività, cerco vari modi per incrementare l'efficienza	,484	,124	,041	-,276
16. Termino i compiti ad alta priorità prima di procedere con quelli meno importanti	,348	,168	-,125	-,258

17. Porto con me un'agenda degli appuntamenti	,114	,802	-,003	-,040
18. Durante una giornata lavorativa, valuto quanto sto rispettando il programma che mi ero prefissato	,553	,323	-,109	-,087
19. Quando sono un po' disorganizzato, sono più capace di adattarmi agli imprevisti	-,120	-,023	,528	,237
20. Mi ritrovo a procrastinare compiti che devono essere portati a termine ma non mi piacciono	,030	-,015	,094	,643
21. Cerco posti dove lavorare che mi permettano di evitare interruzioni e distrazioni	,473	-,211	,021	,119
22. In generale, le mie giornate lavorative sono troppo imprevedibili per poter pianificare e gestire il mio tempo	-,075	-,027	,534	,250
23. Porto con me un taccuino per annotare appunti e idee	,051	,643	,200	-,072
24. A fine giornata lascio la mia postazione di lavoro pulita e ben organizzata	,089	,109	-,513	,023
25. Assegno delle priorità per determinare l'ordine in cui eseguirò I compiti nei giorni successivi	,566	,282	-,308	-,120
26. Quando prendo decisioni su quello che devo eseguire a breve termine, tengo presente gli obiettivi a lungo termine	,573	,091	-,034	-,286
27. Faccio una lista di cose da fare ogni giorno e spunto I compiti non appena li porto a termine	,317	,633	-,171	,071
28. Trovo le cose che mi occorrono per lavorare più facilmente quando la mia postazione di lavoro è disordinata e disorganizzata, piuttosto che quando è ordinata e organizzata	,146	-,003	,597	,043
29. Pianifico le attività con almeno una settimana di anticipo	,478	,330	-,244	-,104
30. Sento di avere il controllo del mio tempo	,341	,193	-,169	-,512
31. Parte delle mie idee più creative mi vengono quando sono disorganizzato	-,026	,006	,654	,216
32. Uso vaschette per il materiale cartaceo in ingresso e in uscita	,281	,230	-,326	,341
33. Non posso fare a meno di dedicare molto tempo a compiti non importanti	-,095	-,041	,183	,640
34. Passo in rassegna I miei obiettivi per capire se hanno bisogno di essere	,604	,007	-,216	,051

ridefiniti				

Tab.1 – Item-total correlations in the four dimensions

Results of the factor analysis showed the solution replicates the allocation of the item except for six item. Particularly:

• the item 9-13-21-29, that in the Macan's version referred to the "Mechanics of time management" scale, in this version refers to "Setting goals and priorities" dimension, whereas the item 32 to "Perceived control of time" scale

• the item 8, originally included into the "Preference for organization" dimension, in the Italian version contributes to the "Perceived control of time" factor.

However, another inspection of the results –using a different extraction method (generalized least squares)- proposed a more appropriated solution with three factors. These factors accounted for 29% of the common variance and so long as they were not correlated between them, they were rotated through the Varimax method. The following table shows the saturations of the factors on the 34 item.

	Components		
	Pianificazione e controllo dei compiti	Tendenza all'organizzazione	Uso di supporti
1. Sento di riuscire a fare un lavoro migliore se rimando i compiti che non mi va di fare, piuttosto che provare a farli in ordine di importanza	-,072	,330	-,209
2. Il tempo dedicato a pianificare e organizzare la mia giornata lavorativa è tempo sprecato	-,120	,425	-,262
3. Tengo un diario delle mie attività	,157	-,157	,634
4. Prendo appunti per ricordarmi quel che devo fare	,070	-,073	,720
5. Definisco obiettivi a breve termine per quello che voglio realizzare nel giro di pochi giorni o settimane	,421	-,180	,304
6. Trovo difficile attenermi a un programma perché gli altri mi distolgono dal mio lavoro	-,131	,442	,117
7. Quando noto che contatto frequentemente una persona, archivio il suo nome, indirizzo e numero telefonico	,119	-,160	,378

8. Quando faccio una lista di cose da fare, a fine giornata l'ho dimenticata o messa da parte	-,137	,450	-,167
9. Riservo parte della mia pianificazione giornaliera per eventi che si verificano con regolarità	,433	,126	,086
10. Passo in rassegna le mie attività giornaliere per capire dove spreco tempo	,553	-,012	,118
11. Riduco i progetti complessi e difficili in compiti più piccoli e maneggevoli	,381	,092	,051
12. Quando decido di portare a termine un compito, mi assegno delle scadenze	,511	-,165	,237
13. Se so di dover passare del tempo in attesa, porto con me qualcosa su cui lavorare	,378	-,026	,221
14. Sottovaluto il tempo necessario per completare un compito	-,119	,543	-,104
15. Nel portare a termine le mie attività, cerco vari modi per incrementare l'efficienza	,436	-,175	,103
16. Termino i compiti ad alta priorità prima di procedere con quelli meno importanti	,314	-,267	,148
17. Porto con me un'agenda degli appuntamenti	,120	-,040	,761
18. Durante una giornata lavorativa, valuto quanto sto rispettando il programma che mi ero prefissato	,532	-,135	,318
19. Quando sono un po' disorganizzato, sono più capace di adattarmi agli imprevisti	-,102	,487	-,074
20. Mi ritrovo a procrastinare compiti che devono essere portati a termine ma non mi piacciono	-,024	,466	,032
21. Cerco posti dove lavorare che mi permettano di evitare interruzioni e distrazioni	,346	,077	-,111
22. In generale, le mie giornate lavorative sono troppo imprevedibili per poter pianificare e gestire il mio tempo	-,061	,505	-,066
23. Porto con me un taccuino per annotare appunti e idee	,071	,061	,544
24. A fine giornata lascio la mia postazione di lavoro pulita e ben organizzata	,086	-,317	,130
25. Assegno delle priorità per determinare l'ordine in cui eseguirò i compiti nei giorni successivi	,543	-,296	,317
26. Quando prendo decisioni su quello che devo eseguire a breve termine, tengo presente gli obiettivi a	,539	-,219	,089

lungo termine			
27. Faccio una lista di cose da fare ogni giorno e spunto i compiti non appena li porto a termine	,315	-,076	,647
28. Trovo le cose che mi occorrono per lavorare più facilmente quando la mia po-stazione di lavoro è disordinata e disorganizzata, piuttosto che quando è ordinata e organizzata	,136	,405	-,039
29. Pianifico le attività con almeno una settimana di anticipo	,466	-,245	,327
30. Sento di avere il controllo del mio tempo	,358	-,491	,152
31. Parte delle mie idee più creative mi vengono quando sono disorganizzato	-,033	,564	-,032
32. Uso vaschette per il materiale cartaceo in ingresso e in uscita	,238	,005	,264
33. Non posso fare a meno di dedicare molto tempo a compiti non importanti	-,128	,531	-,021
34. Passo in rassegna i miei obiettivi per capire se hanno bisogno di essere ridefiniti	,532	-,111	,057

Tab.2 – Item-total correlations in the three dimensions of TMBS

The first factor, that accounted 18% of the common variance is defined "Planning and Control of the tasks", the second factor, that accounted 6,4%, is defined "Preference for organization" whereas the third factor, that accounted 4,6%, is defined "Use of devices". The newest dimensions resulted enough reliable (Tab.3). Since are not available at this stage the final dimensions, the reliability is calculated for each factor using the matrix of covariace for the factors score. The index resulted give an estimation of the stability of the itself factor (Tabachnick e Fidell, 1989).

	Reliability
Pianificazione e controllo dei compiti	0,83
Tendenza all'organizzazione	0,84
Uso di supporti	0,86

Tab.3 – Reliability coefficients of TMBS three factors

Discussions and conclusions

Although in the recent years the interest toward the study of the time management strategies is increased, at present are still few scientific study that have investigated

the ways as individuals use to manage their time and the mechanics involved (Claessens et al., 2007). So as to ameliorate the comprehension of the phenomenon and to measure the individual's abilities even in evaluation settings, the TMBS seems to be the scale more appropriated.

So, the aim of this study was adapting the TMBS to the Italian language by replicating the analysis performed by Macan for the American version. Results of the factors analysis, using Principal Component method, showed as the four dimensions solution replicates almost perfectly that original except six item of which four contributes to the "Setting goals and priorities" factor. However, more interesting is the individuation of a solution with three factors, more appropriated and consistent with the recent considerations made by the author of TMBS (Macan, 1994).

The item that present high saturations on the first factor are all those of the "Setting goals and priorities" factor of the American version and the item 9-21-19 which originally were in the "Mechanics of time management" factor. The second factor includes the entire items that originally were included in the "Preferences for organization " and "Perceived control of time". Finally, the last factor defined "Use of devices" includes the item that in the original version were in the "Mechanics of time management" except for the same item 9-21-29.

Considering that this solution showed high reliability score, it would seem more plausible that the TMBS scale measures three factors instead four. The intern consistence of the three dimensions results more satisfying and the exclusion of none item increase the reliability of the dimensions. In this solution, it's possible – however- to see that the item 32 presented lower saturations in the "Use of devices" factor. To move the item "Uso vaschette per il materiale cartaceo in ingresso e in uscita" in the "Perceived control of time" factor not be appropriated.

However, it must be remembered that our sample consisted mainly of college students who, not having a work, usually they could not use these devices. It possible also to speculate that in the Italian context these devices can be used in a different way in respect to the American context.

The absence of the "Perceived control of time" dimension from this factorial solution could be partly justified by the considerations given by Macan: itself time

management behaviours would not affect the final result but it would operate through the perceived control of their time.

Macan (1994) has argued, indeed, that setting goals and priorities, planning and organizing, it would develop a sense of mastery over how to manage own time, or the feeling to control it. A confirmation of the structure with three factors was also provided by Adams & Jex (1997), although in this study it has been used only twenty-eight items of the original version of the questionnaire.

In general, the results of this study confirm the goodness of the three-factor version of the TMBS. However, further studies are needed to evaluate the predictive ability compared to the performance.

Study 2: Contexts as triggers for getting things done. Improving academic performance by familiarizing students with contextual "to do" lists.

Every day individuals are required to be efficient, productive and to accomplish different activities without leave out own interests, desires and personal goals. However, these activities require a time investment and, since it is a limited resource, often individuals are not able to manage it.

The interest to time management I result from different fields. Numerous are –in fact- articles and books written by practitioners in this topic, principally relative to strategies and programs training aimed to improve efficiency and job performance, to manage tasks and activities (e.g. Drucker, 1967; Lakein, 1973) through, for example, daily planning and setting priorities (McCay, 1959).

Time management has recently attracted scientists' attention. Claessens and colleagues (2007) carried out an important review of time management literature. In their work, they demonstrated that, although in the last years there was an increasing of the publications and theories, the field lacks a commonly accepted definition of the concept. Indeed, there are various definitions of time management: "the process of determining needs, setting goals to achieve these needs, prioritising and planning tasks required to achieve these goals" (Lakein, 1973); "techniques for managing time" (e.g. Macan et al., 1990; Macan, 1994, 1996; Jex and Elacqua, 1999); "cluster of behaviours that are deemed to facilitate productivity and alleviate stress" (Lay & Schouwenburg, 1993); "planning and allocating time" (Burt and Kemp, 1994); "practices intended to maximize intellectual productivity" (Britton and Tesser, 1991) and "behaviours that aim at achieving an effective use of time while performing certain goal-directed activities" (Claessens et al., 2007). The authors also manifested a lack of rigorous methods of analysis of these behaviours, deriving just from the presence of different definitions, which represent non-equivalent operationalizations of the time management construct (Claessens et al., 2007).

Macan (1994) was the first author to provide a process model of time management. In a previous study (Macan et al., 1990), she developed the Time Management Behaviour scale (TMBS) measuring time management behaviours through four dimensions: Setting goals and priorities (referring to goals the person wants or needs

to accomplish and prioritizing of the various tasks to achieve these goals), Mechanics of time management (referring to the behaviours typically associated with managing time, such as making lists and planning), Preference for organization (referring to the preference for disorganization in one's workspace and approach to projects) and Perceived control of time (referring to the extent to which one believes he or she can affect how time is spent). Results of the study showed as aren't time management behaviours having influence on job performance, but this relationship was mediated by perceived control of time. That is, time management behaviours would seem to be carried out if individuals have the perception of being able to control their time (Macan, 1994).

The construct of TM has been investigated in relation to different variables: personality characteristics, stress, job productivity, trait procrastination, daily planning, etc. (e.g. Griffiths, 2003; Macan et al., 1990; Macan, 1994; Macan, 1996; Lay & Schouwenburg, 1993; Trueman & Hartley, 1996). If traditionally the time management problems were peculiarity of practitioners on this topic who suggested different techniques and methods (e.g. making to do lists and planning), recently the attention is paid to relationship between TM and academic performance (Macan et al., 1990; Britton & Tesser, 1991; Trueman & Hartley, 1996). Macan et al. (1990) reported as college students who had a better perceived control of their time, they also perceived a better performance, life and job satisfaction, less role ambiguity, less role overload and fewer job-induced and somatic tensions. Moreover, it has been highlighted the influence of TM behaviours on stress and performance. However, the contributions about effectiveness of TM training programs are mixed. In general, participants believe that their abilities to managing time are improved reporting less physic and psychological stress symptoms too (Hall & Hursch, 1982; Orpen, 1994; Van Eerde, 2003). This is probably due to learning and applying new strategies and to a better awareness of one's own behaviour that helping them to deal with time pressure adequately and reaching their goals (Van Eerde, 2003).

Britton and Tesser (1991) investigated time management abilities in relation to quantitative measures of academic achievement: the grade point average (GPA). To this aim, they developed the Time Management Questionnaire (TMQ) investigating time management behaviours through three dimensions: Short-Range Planning, Time

Attitudes and Long-Range Planning. Particularly, subjects who reported high scores in Time Attitudes seemed being in charge of their own time, being able to say "No" to people, being able to stop unprofitable routines or activities. Subjects who obtained high score in Short-Range Planning reported organizing their day, having a clear idea in advance of what they intend to accomplish during the next week and spending time at the beginning of each day writing a list of goals, a to-do list, and a schedule. Finally, high score in Long-Range planning indicated having a set of goals for the entire quarter and being well organized in their work habits. Results identified Short-Range Planning as predictor of GPA: since academic setting change rapidly and frequently, a short-term planning could be the more optimal strategy. Similarly, Time Attitudes –as strategy similar to self-efficacy- could support a more efficient cognitive processing, more positive affective responses and more persevering behaviour.

Zulauf and Gortner (1999) investigated the relationship between time spent studying and TM skills using a time diary. This instrument required to take note of all activities made for each half-hours time block grouped in specific time use categories: in class, studying, eating, sleeping, job, travel time, telephone, television, planned recreation/leisure, student organization/activities, personal hygiene and other. Results showed an impact, although marginal, of the time spent studying and quarterly GPA. The most interesting result was the relationship between time management skills and quarterly GPA, suggesting as improving these abilities could be enhanced academic performance. Lahmers and Zulauf (2000) replicated the previous Zulauf and Gortner's study using the same instrument. For one week, students have to establish the number of hours they would schedule to be in class and the amount of time they would have studied. Moreover, they have to report only their primary use of time for each half-hour block. Results showed as amount of study time was significantly and positively related to GPA. Although these results couldn't be generalized because the small sample size used, the authors remarked as the time management training could be an efficient way to improving time management skills and academic performance of the students. Also Nonis, Philhours e Hudson 's study (2006) studied the relationship between time spent studying and academic performance. The aim of the study was to investigate, in a typical week, how long

the students were committed in different activities, to identify students profiles divided for employed time and personal/situational variables. Using a diary, the students had to report their activities in three categories: “academic”, “personal” and “other”. Results reported as academic performance isn’t a simple function of time spent studying but a more complex function of how time is spent in the different activities. The analysis of literature also revealed as the failure to schedule time wisely, develop adequate study skills, keep up with course work are some key problems that invalidate academic performance. Particularly, Garcia-Ross et al. (2004) pointed out as the same students manifested the need to learn study habits related to time management and organization.

Following some practitioners of time management (see Lakein, 1973) the basis of a successful time management is planning through to do lists. Indeed, according to Lakein (1973), planning provides a clear idea of what projects needs to be accomplished and how to make them. But studying isn’t the only student’s task: for example they have social and sports activities to accomplish, so they have to carry out different projects in different contexts. Consequently, it’s useful to consider time management in connection with all the contexts where the student interacts.

The aim of this study was to investigate if contextual to-do lists might be act as trigger for getting things done improving academic performance too.

Method

Participants. A total of fifty-five students enrolled in introductory ergonomics classes over two academic years (2008-2009 and 2009-2010) at Sapienza University of Rome volunteered in this research. Twenty-four of them were assigned to the experimental group (mean age = 22.9, SD = 4.6; 18 females), whereas the remaining 31 were considered as controls (mean age = 21.9, SD = 3.0; 25 females). Instructor, syllabus, and teaching materials were the same for all students.

Materials. In order to assess several variables that may have a role in productivity, we administered:

The Italian version of Time Management Behaviours Scale (Coletta et al, 2010). This questionnaire (thirty-four item, 5-point Likert scale) measures the time management behaviours through four dimensions: Setting goals and priorities (that indicate the setting of goals the person wants or needs to accomplish and prioritizing of the various tasks to achieve these goals), Mechanics of time management (refers to the behaviours typically associated with managing time, such as making lists and planning), Perceived control of time (referred to the extent to which one believes he or she can affect how time is spent) and Preference for organization (referred to a general preference for disorganization in one's workspace and approach to projects).

The Big five Questionnaire (BFQ: Caprara et al., 1993). This questionnaire (one hundred thirty-two items, 5-point Likert scale) measures the five fundamental dimensions of personality by means of the following dimension and subdimensions: Energy (Dynamism and Dominance), Agreeableness (Cooperativeness/Empathy and Warmth/Friendliness), Conscientiousness (Scrupulousness and Perseverance), Emotional Stability (Emotional Control and Impulse Control), Openness (Cultural Openness and Openness to Experience) and a Lie Scale.

The Coping Inventory for Stressfull Situations (CISS: Endler & Parker, 1990). This inventory (forty-eight item, 5-point Likert scale) measures the different coping strategies that people may use in stressful situations. These coping strategies are: task-oriented (dealing with the problem at hand); emotion-oriented (focusing on the resultant emotions, such as becoming angry or upset); and avoidance-oriented (avoiding the problem). Avoidance-oriented coping can be further divided into two types: distraction and social diversion.

A Hipster PDA (hereinafter, HPDA) loosely inspired by the Getting Things Done methodology (GTD; Allen, 2002) was developed in order to provide a productivity tool to the experimental group. The HPDA is a paper-based personal organizer comprising index cards (sheets) typically held together with a binder clip. Our HPDA included several (5.59 x 4.92 inches) sheets: "Calendar", "Incoming" and "Project" plus a series of "to do" lists customizable by context (e.g. @home, @school).

In the “Calendar”, each subject had to take note of time-locked commitments and to report the level of stress they experienced during that day using a five-point likert scale. In the “Incoming” sheet subjects had to take note all incoming information and commitments. This information could be moved later to specific sheets (i.e. Project, Waiting for, Calendar). Finally, in the “Project” sheet participants would write the steps needed for completing a task. For each action inserted in “Incoming” and “Project” sheets, participants had to specify the date where they inserted and executed the task and the context where they made it. In our HPDA, context used were: @university, @home, @errands, @phone, @computer, @work and waiting for. Contextual lists are “to do list” organized by context, where a context may be a place, a tool, or a person needed to perform the action. For example, if an Internet connection is needed to perform the action “send e-mail to John”, and if the person uses an Internet connection exclusively at her/his office, @work will be the context. A specific type of list is the “Waiting for”, including those items that need someone else action. For example, if a person is waiting for receiving a document in order to complete a task, the action will be placed in the “Waiting for” list.

Procedure. At the beginning of the course, all students filled out the self-report questionnaires previously illustrated. Subsequently, the experimental group followed a brief training on GTD methodology and each participant received the HPDA. This latter had to be used during the five weeks of the academic course. None specific instruction provided to the control group which had to report only the perceived level of stress for each day.

Data analysis and results.

Performance. In general, the results (fig.1) showed a significant difference between the experimental group compared to control group ($F(1, 53)=5,5629$, $p=.02$). Particularly, the first group showed a better performance in terms of higher grades.

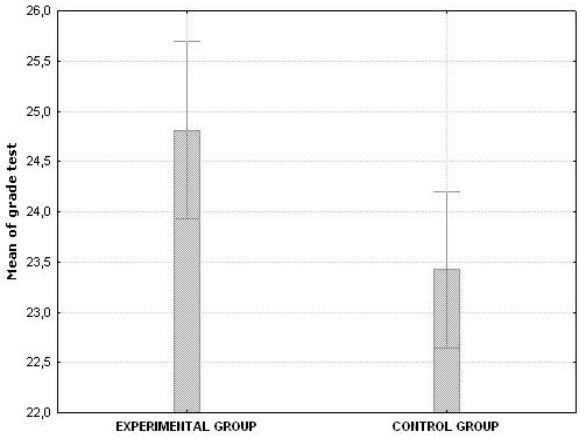


Fig.1 – performance of groups

The performance comparison in the five intermediate exams did not showed significant differences between the groups (F(4, 212)=1,3451, p=.25; fig.2). Nevertheless, investigating the effect of intermediate exam on grade the results showed a significant difference (F(4, 216)=12.189, p<.001) between the tests (fig.3). Particularly, in the first two exams it's no showed significant variations of grade, at the third exam began an improvement that remained stable in the fourth and then continued to increase in the fifth. All data were normally distributed. Further analyses were made using as covariate the difference between the grade point average of the previous exams and the mean of the experimental tests. The results showed an improvement of performance (F(4, 212)=12.058, p<.001).

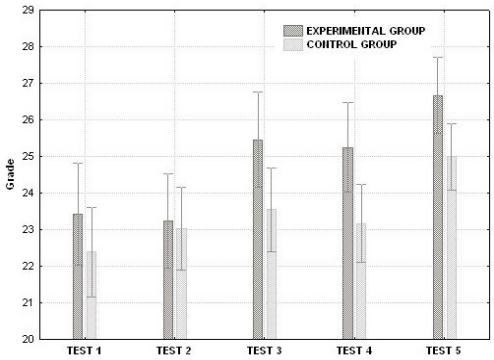


Fig.2 – Grade in the five tests in both groups

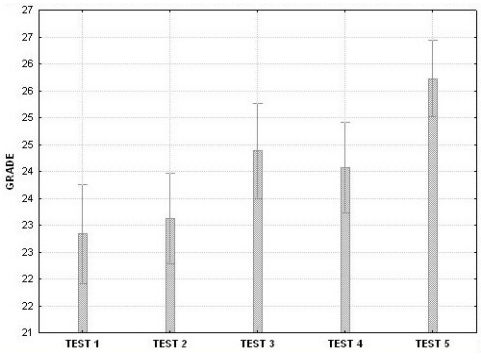


Fig.3 – Differences between the tests

Stress. ANOVA on perceived stress values during the five weeks of experimentation showed a significant interaction between the weeks of experimentation (F(4, 212)=4.1614, p<.003). Particularly, post-hoc testing highlighted as both the groups have expressed a higher perceived level of stress in the latest week in respect to the others (fig.4).

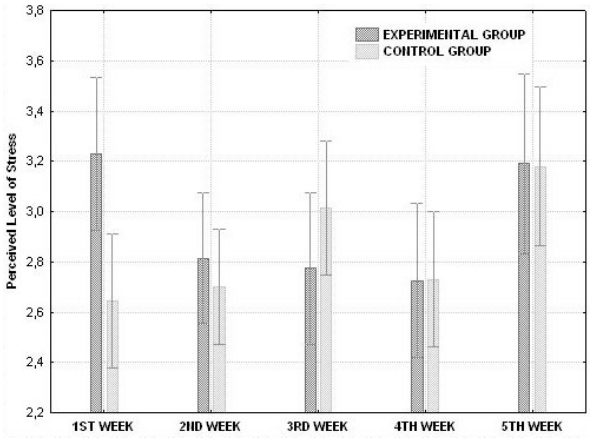


Fig.4 – Perceived level of stress during the five weeks of experimetation

TMBS. The analysis about TMBS questionnaire did not showed significant differences between the groups (F(1, 53)=,77830, p=.38). Neverthless, further analysis are made dividing the sample between "Less" and "More" in respect to the number of exams carried out by the students. The results showed as the students who have made "More" exams were even the ones who obtained a higher score to the total TMBS (F(1, 53)=9,9982, p<.003; fig.5).

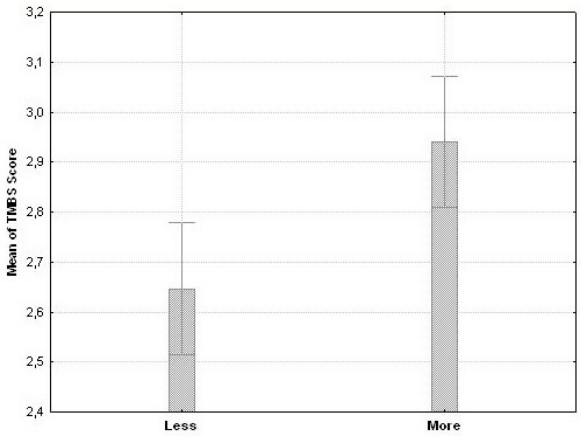


Fig.5 – Mean of total TMBS score separately for number of exams carried out category

The dimensions of TMBS scale (Setting Goals and Priorities, Mechanics of Time Management, Perceived Control of Time and Preference for organization) were used in an ANOVA design as dependent variables using the exams carried out ("More" vs. Less") as factor. Results showed a significant interaction between the four TMBS dimension and the number of exams carried out ($F(3, 159)=3,7445$, $p<.01$). Duncan posthoc testing showed a difference only in the "Setting Goals and Priorities" ($p<.01$) and "Mechanics of Time Management" ($p<.01$) dimensions (fig.6). Subjects who have made more exams obtained a significant higher score in these dimensions.

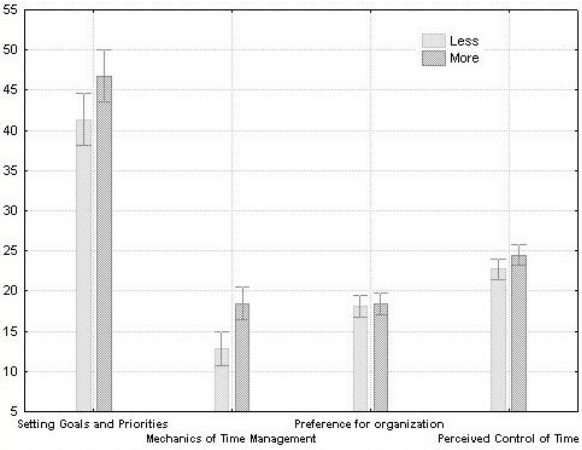


Fig.6 – TMBS dimensions score separately for number of exams carried out category

ANOVA using the mean of grade test as dependent variable and “More”/”Less” categories as factor showed a significant difference ($F(1, 53)=18,941$, $p<.001$). Particularly, who have carried out more exams obtained a better performance in the five tests in respect to who have made less exams. Finally, the analysis between BFQ dimensions and “More”/”Less” categories showed significant difference only in the Energy scale ($F(1, 53)=6,3158$, $p<.01$) and, particularly, in the Dominance subdimension ($F(1, 53)=5,1874$, $p=.03$) indicating as that ones who have carried out more exams obtained a higher score in this dimension.

Considering as point of distinction the median value of total TMBS score, the sample has been divided in students organized/unorganized. The analysis showed as the student better organized obtained a higher score in the total TMBS ($F(1, 53)=93,437$, $p<.001$; fig.7) and they were the same that have carried out more exams previously ($F(1, 53)=8,8221$, $p<.001$). Also the analysis about these categories and the four dimensions of TMBS showed significant effect ($F(3, 159)=18,034$, $p<.001$). Particularly, Duncan post-hoc testing highlighted differences in the “Setting Goals and Priorities” ($p<.01$) and “Mechanics of Time Management” ($p<.01$) dimensions (fig.8) where students organized obtained a higher score in these dimensions. Finally, the analysis between BFQ dimensions and “Organized/Unorganized” variable showed significant difference only in the Conscientiousness scale ($F(1, 53)=4,7951$, $p=.03$). Particularly, in the Scrupulousness subdimension ($F(1, 53)=4,7161$, $p=.03$), the organized students it seem to be more scrupulous in respect to the students unorganized.

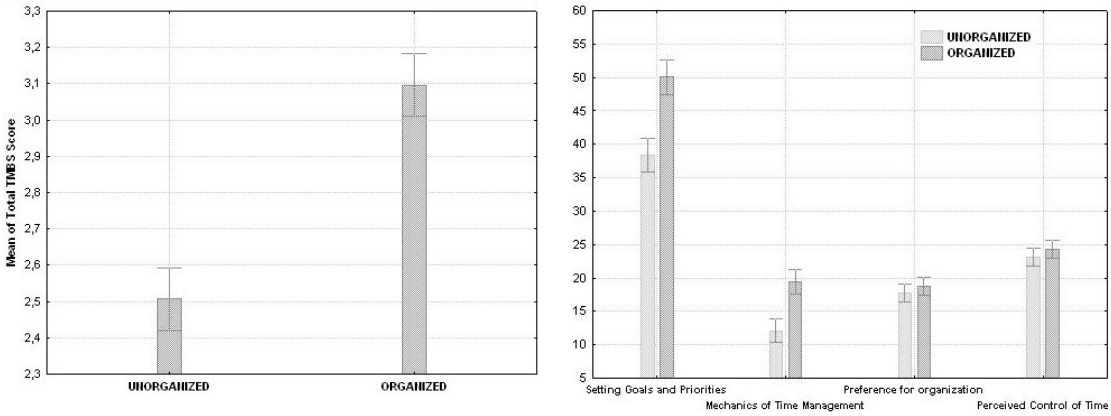


Fig.7-8 – Total TMBS and dimensions score separately for organized/unorganized category

CISS. The analysis about coping strategies of stress did not showed significant differences between experimental and control group. However, using the "More/Less" and "Organized/Unorganised" categories, the analysis showed interesting results. Students who have carried out more exams obtained higher scores in Task-oriented (T) and lower scores Avoidant-oriented (A) coping in respect to subjects who have carried out less exams ($F(1, 53)=10,504$, $p<.001$; fig.9), regardless of membership to experimental or control group (analysis made using as covariate "Group" variable, $F(1, 52)=8,4102$, $p<.001$).

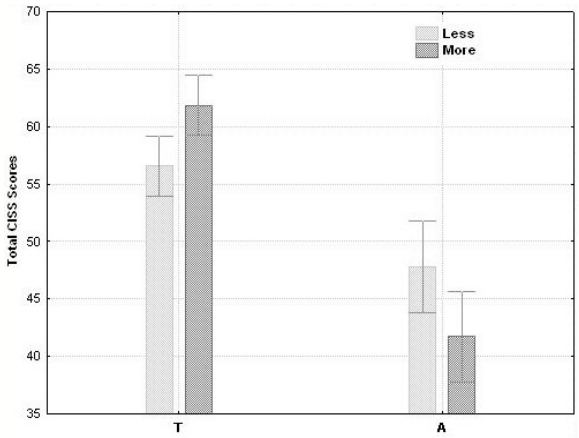


Fig.9 – Task-oriented and Avoidant-oriented scores separately for "Less/More" category

Using the “Organized/Unorganized” category as factor and the dimensions of CISS questionnaire as dependent variable, the results showed a not-significant –but not negligible- effect (F(2, 106)=2,1259, p=.12; fig.10) . Duncan pot-hoc testing showed a p=.02 difference between organized and unorganized in the Emotion-oriented (E) and a p=.09 in the Task-oriented (T) coping. Although this latter result was not significant, showed a not negligible tendency.

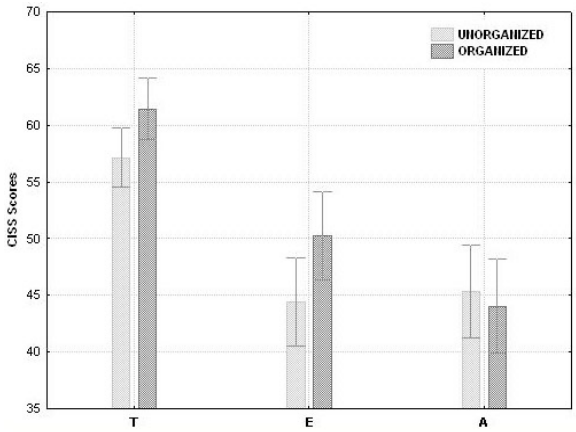


Fig.10 – CISS scores separately for “Organized/Unorganized” students

Hipster PDA. Calendar sheet. The analisys on “calendar” sheet showed no difference in use during the five weeks. Although the frequency of use remained the same throughout the experimental period, there was a marked descending trend in the last week (F(4,92)=2,0332, p=.09).

The comparisons between use of “calendar” and perceived levels of stress showed that the seven calendar users, founded to be more stressed in the two first weeks. This result could be due to the change in the methodology used. In contrast, calendar first timers perceived a higher level of stress only in the latest week of experimentation.

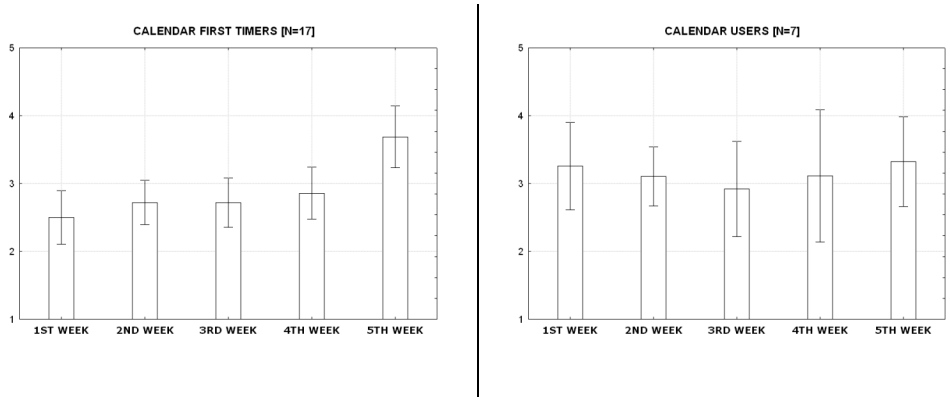


Fig.11 – Perceived level of stress in the five weeks of experimentation respectively by calendar first timers and calendar users

Further analysis between the calendar users and information inserted showed that the ones who used previously a calendar inserted more "other" item in respect to the ones who used it for the first time. The imbalance between the two groups could explain the absence of significant differences in the results.

"Incoming" and "Projects" sheets. The analysis about "Incoming" ($F(4,92)=3,0392$, $p=.02$) and "Projects" ($F(4,92)=5,1524$, $p<.001$) sheets showed similar results: post-hoc testing indicated as, in the latest week, it have been made a lower number of activities.

Contexts. In relation to contexts use, the context "@work" was that one less used by participants. The next image shows the proportions of use of the different contexts investigated.

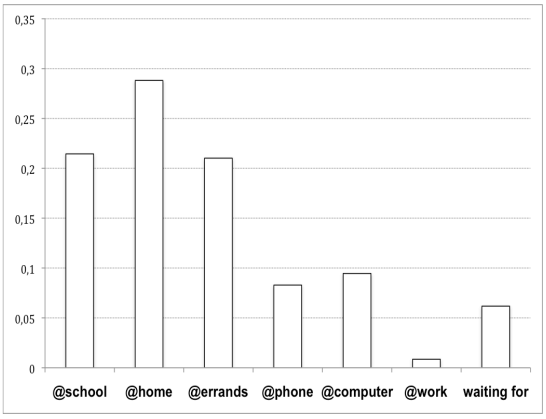


Fig.12 – Proportions of use of the different contexts during the five weeks of experimentation

So, the analyses on the contexts were made omitting the context "@work". As illustrated in the next image, significant differences were identified between @school/@home/@errands contexts and waiting for/@phone/@computer contexts ($F(5,115)=12,004$, $p<.01$).

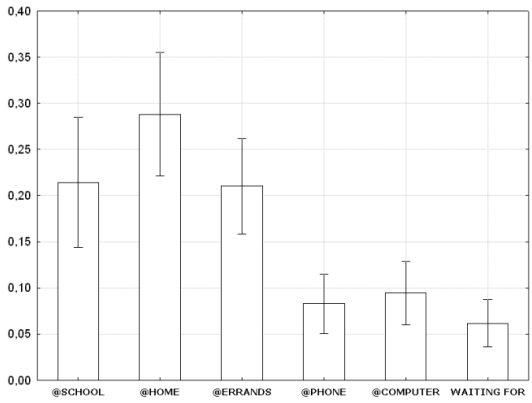


Fig.13 – Contexts use during the five weeks of experimentation

A specific analysis was made on the relationship between @work context and use of "calendar". Results showed a significant interaction ($F(1,22)=5,3702$, $p=.03$) indicating as subjects who previously used a calendar included a greater amount of information in the @work context.

Discussion and conclusions

Several studies showed as developing adequate study skills, keeping up with course work are some key problems that invalidate student's academic performance. Consequently, in the last years, time management training programs are increased With the aim to improve these abilities and above all because some studies (see, for example, Campbell & Svenson, 1992) demonstrated that effective time management strategies increase academic performance. However, the time management term is misleading because the time it's an inaccessible factor. According to Eilam and Aharon (2003), time management can be viewed as a way of monitoring and

controlling time. In this study we believe that it's more appropriate to define them as productivity, that is, getting things done.

This work gets into the studies overview existing With the aim to investigate some relationships and implications between time management behaviours and academic productivity. For this purpose we carried out a specific HPDA, loosely inspired to getting things done methodology, where the students had to report theirs activities, incoming information, projects and the daily perceived level of stress. For each week it was measured theirs performance through a test about a specific topic. This group was subsequently compared to a control group that doesn't received specific information, but the components had to report only the perceived level of stress. Also in this case, the performance was measured through a weekly test.

The results of this study showed as using a Hipster PDA for the student's activities may positively affects academic performance. Particularly, the experimental group obtained a significant improvement (in terms of higher grades) compared to control group, index of efficacy of instrument used. This improvement resulted more marked in the latest week probably due to strengthening of the method of time management adopted. The analysis about the perceived level of stress showed the same pattern. Particularly, both the groups showed a higher level of stress in the latest week indicating a constant perceived level of stress during the whole period of experimentation.

None difference came out between the two groups in respect to TMBS scale. However, the division made in two subgroups ("More/Less" and "Organized/Unorganized") were highlighted interesting results. The students who carried out more exams during their academic career obtained a higher score in the total TMBS questionnaire in respect to that ones who made a lower number. Particularly, they were resulted to be more energetic/dominant and to be able to setting goals and priorities and putting on time management mechanics for managing theirs activities. According to Caprara et al. (1993) who defined the individual with energetic/dominant personality as active, energetic, precise and outcome oriented, isn't surprising that these subjects have obtained higher score in these dimension. Therefore, the students who made more exams are individuals who, being outcomes

oriented, have carried out typical time management behaviours making, for example, to-do list, scheduling and organizing work obtaining a better performance in the five tests.

The analysis using "Organized/Unorganized" categories showed similar results with previous categories: the students considered organized have carried out a higher number of exams, were resulted more conscientious/scrupulous and have obtained higher scores in the total TMBS scale. Also in this case Setting goals and priorities and Mechanics of Time Management were the dimensions predominant in this group in respect to controls. Considering that TM don't work for everyone (Macan et al., 2010) and that it can be described as a self-controlled attempt to use time in a subjectively efficient way to achieve outcomes" (Koch & Kleinmann, 2002), individual difference variables can affect the efficacy of these mechanism. As also illustrated by Feig (1996), the relationship here highlighted between Conscientiousness/Scrupulousness and these TMBS dimensions confirm that the Conscientiousness is related to a tendency to make list, plan and prioritize activities. In the literature, the coping strategies are described as functional to managing the problem causing stress and governing emotion relating to those stressors (see Lazarus & Folkman, 1984) subdividing them in coping task-oriented, emotion-oriented and avoidance-oriented (Endler & Parker, 1990). The findings of our work showed as the students who have made more exams (so independently to be a member of experimental or control group) resulted to be more task-oriented and less avoidant-oriented coping respect to that carried out a lower number of exams previously. An Emotion-oriented coping seems to be used –instead- by the students organized. These results confirm previous studies (Mattlin, 1990) that showed as a subject task-oriented copes with stress focusing himself on the problem rather than evading them or engaging himself in unrelated activities for reducing these feelings. Our results, in agreement with some authors (i.e. Kariv & Heiman, 2005) showed as academic work is defined principally through a task orientation and academic stress is coped primarily through an emotion-oriented strategy. These findings are moreover confirmed by the managing of activities for solving specific problems and reconceptualizing positive of the event inducing-stress reported by the students for coping with stress.

The analysis about use of calendar allowed to separate the sample in two groups: 1) subjects who used this instrument for planning activities for the first time and 2) subjects who used a calendar previously. Although the analysis between perceived levels of stress and calendar use showed a constant level of stress on total sample, the calendar users showed an increase of perceived level of stress in the two first week of experimentation and more "other" item (item untied to the academic course). This result can be attributed to the different modality of use requested by the new instrument.

Specifics analysis about use of contexts showed in general as those mainly used were "@school", "@home" and "@errands" whereas "@work" was the least used of all. This isn't surprising: it's just in these contexts that are carried out the main study and social activities of a student. A specific analysis showed a significant interaction between "@work" context and "Calendar" sheet indicating as the largest information in this context were inserted by who used already a calendar. This result can be due to the familiarity with this planning instrument that probably allow a most capacity to discern and better contextualizing the different activities.

A problematic area for studying time management in academic field concerning the survey instruments, among which, seems to predominate the use of diaries. Most of the studies (see Zulauf & Gortner, 1999; Robinson & Godbey, 2005; Nonis et al., 2006) used the diary as quantitative instrument of measurement. Generally, the aim was to measure the time spent to carry out different activities or, particularly, studying activities to investigate the relationship between time spent studying and GPA. Our study differs from others for nature and goal of the instrument. The "Calendar" given to the students it doesn't only a way to collecting information about study activities in a specific times lock, but an instrument through which the student can organize and plan own activities by means to-do lists contextualized. In this way, it was provided a better and more useful visualization of all activities to accomplish in order to optimize the time needed to execute them.

Although are needed further deepening, this work is part of knowledge framework quite wide to make comparisons about survey instruments commonly used, results

obtained and to provide hints for future studies on time management and academic productivity.

Study 3: The power of contexts

This study investigates the relationship between actions and contexts. The actions are tasks which to be carried out in a given period of time and space, while contexts are places, persons or objects that are needed to carry out these actions and projects.

The aim of the study was investigate if and how the contexts may influence, positively or negatively, the completion of projects and if there is a positive relationship between sets of actions related to a classification based on contexts and sets of actions included in a simple list (in our case list for projects).

In order to verify this relationship, we analysed the state of completion of three projects on the strength of the total and partial time for completion of projects and the four dimensions of the TMBS questionnaire previously validated.

The assumption is that subjects using a classification for context would have a better chance to complete all actions in good time and adopt a more linear trend in the advancement of project.

Method

Participants. A total of twenty-seven students volunteered in this research (mean age=24,85; SD=1,51). Twenty two were females (mean age=24,81; SD=1,62), five were males (mean age=25; SD=1). The sample was divided randomly in two groups that had to carry out the same three projects. The two groups differed in the method used to perform the projects and, depending on this, have been named: "Context group" and "Project group".

Materials. All subjects had seven cards where were reported the actions to carry out for accomplish the three tasks. The three tasks were: "Write a report", "Take note of the audio services of Trenitalia customer service" and "Prepare noodles rainbow". The "Context group" was given cards where the actions needed to complete the projects were listed in a classification based on contexts (see Appendix A, sheets 1-4). The five contexts used are: "House" "Market or Supermarket" "University"

"Household" "Termini Station". The "Project group" has been provided seven cards where the actions were simply ordered in the form of list into the three projects to be implemented (see Appendix B, Sheet 5-8). The number of the actions to be performed (38) was equal for both groups.

Procedure. At the beginning of the study, each participant received the necessary instructions to perform the task and the cards to use during the week of the study. To accurately measure the progress of work and projects, a double daily communication were made where each of participants was to provide information about personal advancement in the experiment.

At the end of the study, all subjects returned the entire material and filled out the Italian version of TMBS questionnaires previously mentioned.

Data analysis and Results.

To test the hypothesis that there is a difference in the organization between actions associated with a context and actions ordered in the form of list, an ANOVA was conducted using "group" as fixed factor and the proportion of actions carried out as dependent variable.

The results showed no significant effect ($F(6,132)= 0.75$, $p>0.05$)

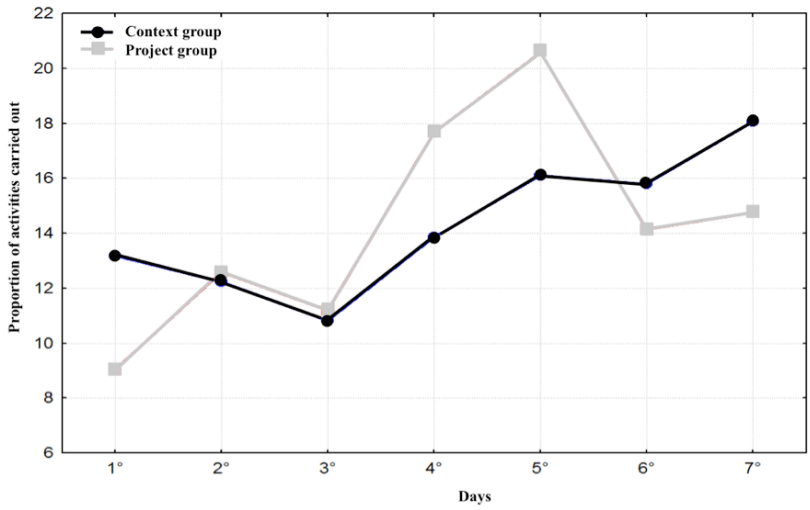


Fig. 14 – Proportions of actions carried out during the experimental week.

Also the analysis using “Group” as fixed factor and the four dimensions of TMBS as dependent variable, showed only a tendency towards significance (F(1,24)=3,92, p=,06).

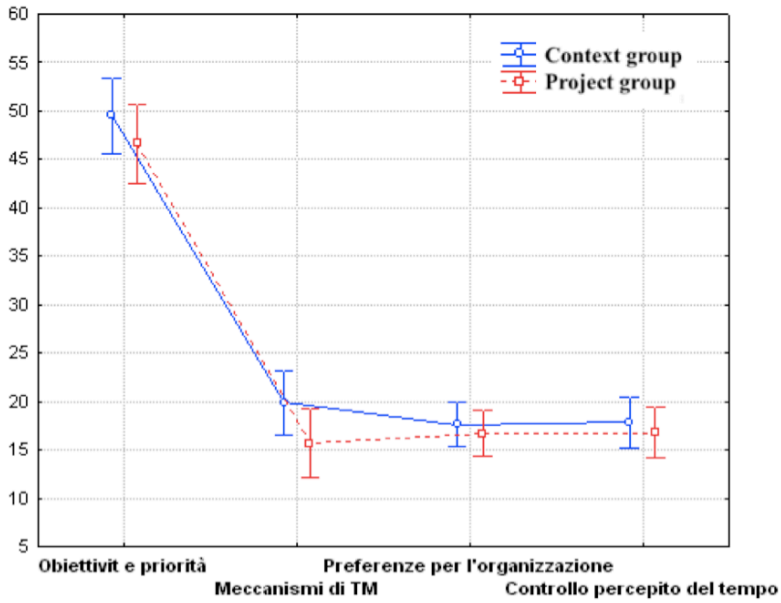


Fig. 15 – Total scores in the four dimension of TMBS questionnaire

Discussion and conclusions

The results of this study did not confirm the initial assumptions. However, it should be noted that in the case of actions context-based the development of the task is more regular in respect to the actions lists-based. In addition, we also notice a greater proneness to work organization more linear in subjects who performed the actions associated with contexts in comparison to a more vertical performance, especially towards the end of time available (5 day), in subjects have performed the actions associated with the lists.

Despite the lack of statistical significance, noting the trend of the graph and the data tending to significance, it’s could consider the possible validity of this study and of the hypothesis proposed.

The probable causes of this lack of significance may be sought: a sample sizes too small (only 27 subjects); a sample too homogeneous with regard to age and type of

employment work; and a sample affected in the freedom of organization and action by the presence of the experimenter rather constant.

Bearing in mind the limitations of this study, further researches will try to investigate, with the same methodological and theoretical characteristics, the relationship between actions and contexts. For example, using a larger sample that exceeds at least 70 participants, between the age 20 and 60 age and employed in different work positions. In addition, it will develop a card where participants will record their daily activities autonomously, without the constant presence of the experimenter.

Study 4: Proneness to error and time management

Reason (1990) in his book on the human error claimed “the failures of prospective memory [...] are the most common form of human fallibility”. However, the majority of prospective memory errors that occur in the workplace critics are not the result of the negligence of workers, of neglect or carelessness and who make mistakes of this kind does not necessarily mean it is a bad person.

The error is always a topic investigated in the literature and over the years have been different approaches to its study. Traditional approaches suggested that an error is an individual phenomenon where the individual is the main responsible and then cause of the error. More recent approaches, instead, pertaining to cognitive tradition, have focused on the classification of errors, highlighting the psychological aspects.

In this direction, the taxonomies are the method mainly used (see Norman, 1988; Reason, 1990; and Wickens, 1984) and they differ from each other depending on the point of view taken to investigate. For example, Reason (1990) and Wickens (1984) investigated the psychological mechanisms involved in the cause of errors, such as lack of memory in repair mechanisms of mistakes, the lack of reception and poor decision-making in the management of errors.

Within the traditional studies on human fallibility is part of an alternative perspective, developed in the ‘80s, on the construct of proneness to error (absent mindedness). Unlike to previous studies where the error analysis has implicitly left to think that all individuals are equal with respect to the probability of making errors, according to this perspective regardless of the context there are people who are more likely to commit them.

The propensity to error has always been a controversial construct and investigable only retrospectively. In this regard, a great deal of retrospective studies was conducted to identify any underlying cognitive dimensions. The results of these studies are conflicting, and the correlations between traits and probability of committing errors are generally very low. Some people, in fact, may are more often victims of accidents simply because they are more exposed to risks. It ‘important to emphasize that fact, any study about the absent-mindedness needs to take these

aspects into consideration to avoid bias in the interpretation of the results. To date there is still an instrument to measure this construct, but there are inventories of errors that can be used to obtain information on their frequency. The most recognized is the Cognitive Failures Questionnaire (Broadbent et al., 1982), which provides information on the frequency errors daily. In general, the recognition of a greater or lesser propensity to error directs the research of cognitive factors and individual differences that determine how these differences are stable over time or temporary state influenced by variables outside the individual.

The aim of this study was to investigate the relationship between personal productivity and proneness to error, operationalized through the number of cognitive errors that people claiming to commit to answering to the CFQ questionnaire. In this regard, it is assumed that doing a job in an organized setting, having a better perception of time, using specific aids to remember things, and better time management are elements able to promote the occurrence of a fewer cognitive errors. In particular, since the success of various job activities depends on the ability shown by individuals to remember to do certain things, we wanted to investigate also how working in an organized environment where to produce effective signals or cues for the recovery of memory, can aid people to improve their productivity.

This study is not able to distinguish the direction of the effect. However, a possible relationship between dimensions of personal productivity and proneness to error could more easily explain (in terms of influence of the absent mindedness errors) the way that people choose to handling the tasks. On the other hand, the acquired habit to manage their activities by paying attention personal productivity may reinforce attention where is happening and will happen, reducing the typical cognitive errors considered as indicative of the existence of “proneness to error”.

Method

Participants. Three hundred subjects volunteered in this research (mean age=36,9; SD=11,26). 146 were females (mean age=33,9; SD=10,3), 154 were males (mean age=38,2; SD=11,8). The sample was such subdivided: 197 employees, 49 self-employed, 44 students, 4 soldiers, 4 housewives and 2 retired.

Materials and procedure. All participants filled out the Italian version of TMBS questionnaire previously validated (Coletta, Polzella, Di Nocera, 2010) and the Italian version of Cognitive Failure Questionnaire (Broadbent et al., 1982; CFQ). The CFQ (twenty-five items, 5-point Likert scale) investigates the frequency of errors daily successes referring to the past six months. The item of CFQ are formulated in a negative way and thus the high CFQ scores are considered as a greater number of cognitive errors made by the subjects.

Data analysis and results.

Reliability. The analysis showed acceptable scores for three dimensions of TMBS. Only the Perceived control of time obtained a value less than r=0.6 (see table 4). However, considering that this dimension is composed of only seven items it is believed that this result hasn't implications for the following analysis.

	Cronbach's Alpha
Setting goals and priorities	.79
Mechanics of time management	.77
Preference for organization	.63
Perceived control of time	.45

Tab.4 – TMBS reliability statistics

Also the CFQ questionnaire showed good scores of reliability (α= .83).

Correlations. As showed in table 5, the total TMBS score showed significant and high correlations with "Setting goals and priorities" (r=.824) and "Time management mechanisms" (r =.712) dimensions. A less intense but still significant correlation was also found with the "Perceived control of time" dimension (r=.266).

The "Setting goals and priorities" showed significant correlations with "Mechanisms of TM" (r=.471) and "Preferences for organization" (r=-.249). Since the subscale "Preferences for organization" is composed of items worded in a negative way it can be stated that the purpose of establishing goals and priorities occurs in conjunction with the use of appropriate mechanisms to manage time and a marked preference for organization.

Similarly, a significant relationship, although weak (r=-.180), was found between "Mechanisms of TM" and "Preference for organization" to demonstrate that these two events tend to occur in order the joint.

Finally, with regard to the dimension "Perceived control of time" it was found that this dimension showed a positive correlation with the "Preference for organization." Also this dimension consists of items worded in a negative way and can be interpreted by saying that working in an orderly manner is also associated with good control of time perception.

		1	2	3	4	5
1. TMBS overall	Pearson	1	,824**	,712**	,077	,266**
	Sig. (2-code)		0.00	0.00	,183	0.00
	N	300	300	300	00	300
2. Setting goals and priorities	Pearson	,824**	1	,471**	,249**	-0,064
	Sig. (2-code)	0.00		0.00	.00	0,273
	N	300	300	300	00	300
3. Mechanics of time management	Pearson	,712**	,471**	1	,180**	0,031
	Sig. (2-code)	0.00	0.00		,002	0,595
	N	300	300	300	00	300
4. Preference for organization	Pearson	0,077	-,249**	-,180**	1	,380**
	Sig. (2-code)	0,183	0.00	0,002		0.00
	N	300	300	300	00	300
5. Perceived control of time	Pearson	,266**	-0,064	0,031	380**	1
	Sig. (2-code)	0.00	0,273	0,595	.00	
	N	300	300	300	00	300

** Correlation is significant at the 0.01 level (2-tailed).

Tab.5 –TMBS correlations

Further correlations were performed to examine the relationship between CFQ and TMBS questionnaire. The CFQ scores showed a positive and significant correlation with the "Preferences for organization" (r=.373) and "Perceive control of time" (r=.449) dimensions. Since the subscales which have shown a correlation with the CFQ are formed by negatively worded items, it can explain that the positive correlation indicates how the growth of a preference for organization and the growing control of the time correspond to a smaller number of cognitive errors. The table below (Table 6) shows the results obtained.

		CFQ overall
TMBS overall	Pearson	,074
	Sig. (2-code)	,198
	N	300
Setting goals and priorities	Pearson	-,089
	Sig. (2-code)	,124
	N	300
Mechanics of time management	Pearson	-,057
	Sig. (2-code)	,329
	N	300
Preference for organization	Pearson	,373**
	Sig. (2-code)	,000
	N	300
Perceived control of time	Pearson	,449**
	Sig. (2-code)	,000
	N	300

**Correlation is significant at the 0.01 level (2-tailed).

Tab.6 – Correlation between TMBS and CFQ

Analysis of variance. In order to identify a main effect of the four TMBS dimensions and number of cognitive errors committed, it was performed a MANOVA: the fixed factor was the "high" and "low" proneness to error categories (formed subdividing the sample on the strength of the median score) and the four TMBS dimensions as dependent variables. As illustrated in fig.16, the results showed a significant difference only in the "preference for organization " and "Perceived control of time" dimensions ($F(3, 894)=10{,}810$, $p<.00$).

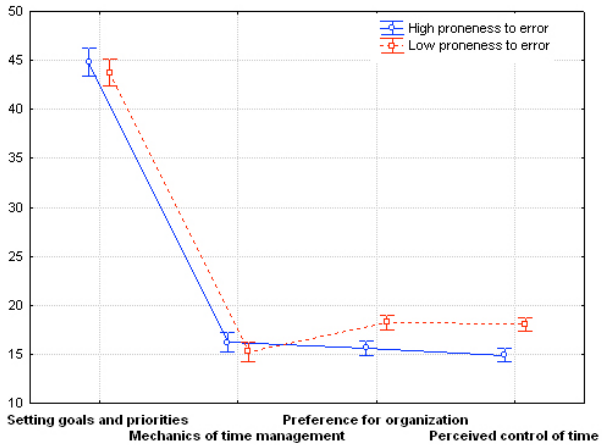


Fig.16 – Scores in the TMBS dimensions separately for high/low proneness to error

Post hoc Duncan test showed as this difference was in the "Preference for organization" (p=.00) and "Perceived control of time" dimensions (p=.00).

Based on these results, two separated ANOVA are made using (in both) as fixed factor the "high" and "low" proneness to error categories and the two TMBS dimensions separately. Results showed as subjects with low proneness to error were the same who have a greater preference for organization (F(1, 298)=23,472, p<.00) and a greater perceived control of time (F(1, 298)=47,470, p<.00) (see fig. 17 and 18).

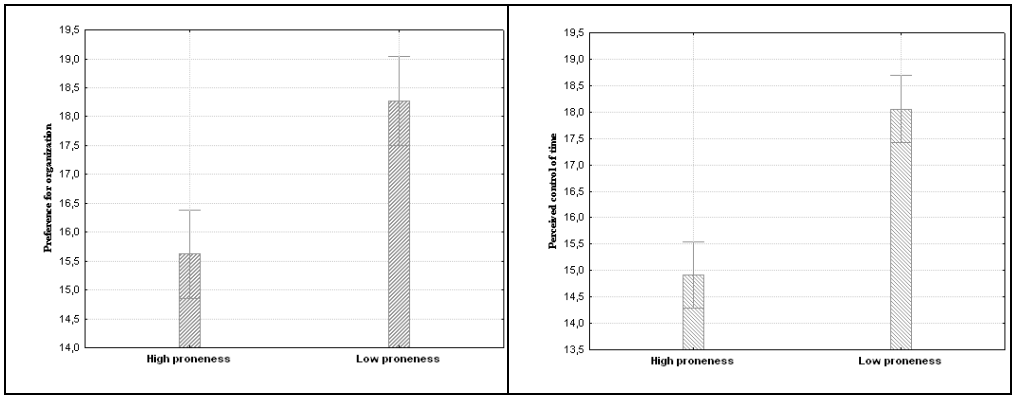


Fig. 17-18 – Scores in the "Preference for organization" and "Perceived control of time" dimensions separately for high/low proneness to error

That is, they were the same who declared to commit fewer cognitive errors during their activities.

Discussion and conclusions

The aim of this study was investigate the relationship between time management and proneness to errors. In particular, we find that a preference of individuals to work in an organized environment and a better perception of time are factors that can facilitate the fulfilment of a smaller number of cognitive errors and, consequently, also to meet the oversights that occur daily in a disorganized workplace or in situations where they assess incorrectly the time in hand.

These results were statistically significant and supported the hypothesis that working in an organized environment where the individual fully understands what he has to do, when and how to do it, can have a positive impact on the productivity of staff. Similarly, even greater perceived control of time seems to have a positive effect on larger levels of personal productivity because high values in this dimension lead people to commit fewer cognitive errors in their activities. It follows that behaviours oriented to better manage time and organize and plan work activities are not considered as superfluous: on the contrary, such actions as keeping a diary of activities, taking notes, placing the materials on paper, systematically checking e-mail or creating lists of things to do, take the form of behaviours that increase the skills of time management for individuals, helping to create efficient working environments and increase the individual performance of each impacting negatively on the number cognitive errors they commit as a result of forgetfulness.

In conclusion, since the success of various job activities depends on the ability shown by individuals to remember to make certain things, we showed also how working in an organized environment where to produce effective signals or cues for the recovery of memory, can aid people to improve their productivity.

Study 5: Construction of a questionnaire on behavioural markers of personal productivity

In recent years increased interest in the study of time management strategies that individuals put in place to carry out their tasks. At the same time, many tools were developed for this purpose. However, one of the main limitations is that most of these are based on individual assessments of the effectiveness of the behaviour of TM. The only, at present, which turns away from them is Macan's TMBS that provides a measure of how people actually put in place these behaviours.

It's, therefore, needed to develop tools that are based on observable and structured behaviours to detect which are useful for a good performance.

A further aim of this work was provided a contribution to construct and validate a questionnaire for identifying behavioural markers of personal productivity: we tried to build a new tool to bring out, and measure, time management behaviours which people put in place in the management of their activities. This scale was created with the aim of creating a questionnaire useful in the selection processes, which measures the degree of personal productivity of individuals and that allowed us to investigate the changes in the productivity of individuals over time assuming that the measurement tools currently used evaluate opinions and not behavioural markers.

Method

Development of Behavioural Markers of Personal Productivity (BMPP)

An interview with open questions was administered to a group of 40 subjects (mean age = 42 years, dev.st = 7.0, 27 females). The questions of interview were generated by the knowledge derived from analysis of the literature and investigated the individual's behaviours in respect to time management. They concerned, for example, the type of tools used to manage activities, how tasks are performed, how activities and materials are organized for carrying out own goals, etc. At the end of the interviews were generated and selected a 70 item. Subsequently, this first version of the questionnaire it was administered to a sample of 689 subjects.

The following sections will illustrate the results of the administration of this first version of the questionnaire.

Participants. Six hundred and eighty-nine subjects (mean age=33; SD=12,01) volunteered in this study. Three hundred and sixty were females (mean age=32; SD=12,2) and three hundred and twenty-nine were males (mean age=33; SD=11,8). Freelancers, employees and students composed the sample.

Procedure. Subjects completed the first version 70-item BMPP rating each statement on a five-point Likert-type scale that ranged from Never (1) to Always (5).

Data analysis and results.

Factorial analysis. Data were analysed employing the Principal Axis Factoring method. The scree plot showed the scale to consist of four factors. The factors were rotated using a Varimax rotation and were retained that accounted for 30,5% of the common variance. All redundant and non-contributing items (i.e. item-total correlations less than .29) were removed, resulting in the 49-item BMPP used in this study.

The four factors were labelled as: Factor 1-Control; Factor 2-Use of paper and pencil tools; Factors 3-Planning; and Factor 4-Use of digital tools. Factor 1, that accounted 13,39% of the common variance, includes items referred to the control of the activities or create to-do lists and is composed of 19 item. Factor 2, that accounted 9,17% of the common variance, refers to the use of paper tools for taking notes of appointments, making to-do list, etc. and is composed of 11 item. The items making up Factor 3, that accounted 4,15% of the common variance and is composed of 12 items, reflect the planning activities of commitments and tasks. The last interpretable factor, Factor 4 (that accounted 2,80% of the common variance), refers to the use of digital instruments for managing own activities and is composed of 7 items. The following table shows the saturations of the four factors.

	Factor 1	Factor 2	Factor 3	Factor 4
Lascio sulla scrivania cose che dovrei riporre altrove	.713			

Lascio per casa (per esempio: in soggiorno o in cucina) cose che dovrei riporre altrove	.723			
Mi capita di non ritrovare le cose che cerco (anche cose importanti come chiavi, portafogli, ecc.)	.598			
Lascio sul desktop del mio computer files e cartelle che dovrei inserire altrove	.590			
La mia scrivania è ingombra di documenti (per esempio: bollette da pagare, articoli da leggere, moduli da pagare, ecc.) di cui non mi sono ancora occupato	.567			
Il mio portafogli (borsa/zaino/borsello) è pieno di vecchi scontrini, biglietti da visi- ta e foglietti di cui avevo dimenticato l'esistenza	.519			
Mi capita di tornare a casa dopo aver fatto la spesa e mi accorgo di non aver acquistato tutto quel che avrei dovuto	.506			
Chiedo ad altri di ricordarmi gli impegni (per esempio: "Mi ricordi di comprare il pane?")	.478			
Mi capita di accorgermi di non aver fatto cose importanti	.469			
Mi capita di essere in ritardo perché non mi sono svegliato in tempo	.458			
Mi capita di sottostimare il tempo necessario per fare quel che devo fare	.436			
Conservo cose che uso raramente o che non userò mai	.428			
Arrivo in ritardo agli appuntamenti con amici e parenti	.426			
Termino la mia giornata lavorativa senza aver raggiunto gli obiettivi che avevo stabilito	.386			
Mi capita di accorgermi di non avere biancheria pulita a disposizione	.385			
Dò priorità alle cose che mi piacciono di più e rimando le cose che mi piacciono di meno	.359			
Arrivo in ritardo agli appuntamenti di lavoro	.358			
Mi capita di accettare un impegno e poi pentirmene	.358			
Mi capita di scrivere un impegno in agenda e poi non consultare l'agenda	.310			
Porto l'agenda con me		.738		
Ho a portata di mano le liste di impegni e di appuntamenti		.709		
Quando devo annotare qualcosa da fare, mi capita di scriverlo in agenda an- che se non si tratta di un'azione da eseguire in un giorno specifico		.653		
Uso l'agenda anche come diario (per annotare cose accadute e appuntamenti)		.586		
Se mi viene in mente (o mi viene comunicato) qualcosa che dovrò fare, mi affido alla mia memoria		.567		
Uso liste per le cose da fare (per esempio: spesa, invitati, viaggi)		.515		
Porto un taccuino con me		.509		
Uso l'agenda esclusivamente per annotare gli appuntamenti		.494		

Scrivo liste separate per gli impegni da svolgere a casa e al lavoro		.420		
Uso i post-it per annotare gli impegni		.330		
Quando devo eseguire più compiti, li ordino in base alla priorita			.502	
Quando lavoro ho già a portata di mano ciò che mi occorre per lavorare			.498	
Pianifico i miei impegni giorno per giorno			.447	
Pianifico le mie attività in termini di singole azioni da eseguire			.437	
Porto a termine gli impegni in anticipo rispetto alla scadenza che mi è stata as- segnata (o che mi sono io stesso assegnato)			.431	
Aggiorno il mio archivio di documenti (per esempio: bollette pagate, ricevute fiscali, documenti, ecc.)			.430	
Archivio i documenti riguardanti compiti (o attività) che ho realizzato (per esem- pio, vecchi progetti)			.425	
Faccio verifiche periodiche per ottenere informazioni sull'avanzamento dei lavori (sulle mie attività e su quelle di eventuali collaboratori)			.414	
Eseguo immediatamente le cose che richiedono pochi minuti			.381	
Faccio copie (per esempio: fotocopie, backup su supporti esterni, mail a me stes- so) delle cose importanti			.371	
Quando sono concentrato su un lavoro non mi faccio interrompere da niente e da nessuno (anche e-mail, chat, ecc.)			.364	
Sulla mia scrivania dispongo i documenti in pile organizzate per area tematica			.360	
Durante la giornata consulto la mia casella di posta elettronica				.834
Nel rispondere alle e-mail dò priorità a quelle che reputo importanti				.661
Rispondo subito alle e-mail che ricevo				.661
Elimino immediatamente le e-mail e i documenti che non considero utili/impor- tanti				.479
In genere, rispondo alle e-mail in base al tempo che occorre per fornire una ris- posta (prima quelle più rapide, poi quelle che necessitano più tempo)				.361
Uso la sveglia per essere sicuro di svegliarmi in tempo				.319
Faccio uso di strumenti tecnologici avanzati per la gestione dei miei impegni e delle informazioni (per esempio: agenda elettronica, sincronizzazione computer/ cellulare)				.309

Tab.7 – Item-total correlations in the four dimensions

Reliability. The reliability for each of the BMPP factors and overall BMPP score are represented in the following table.

	Cronbach's Alpha
Controls	.86
Use of paper and pencil tools	.78
Planning	.79
Use of digital tools	.73

Tab.8 – BMPP reliability statistics

Discussion and conclusions

The purpose of this study was to develop a tool able to identify behavioural markers of personal productivity: observable behaviours that promote or not a good performance.

Unlike others questionnaires that mainly employ the individual assessment on the efficiency of TM behaviours, the item of this tool have been developed with the intention to individuate those behaviours actually useful for individuals in managing their tasks and to provide a valid tool for the selection processes, measuring the degree of personal productivity of individuals. Although the results obtained are important, more studies are needed for improve this instrument.

Study 6: Prospective memory and time management.

The relationship between prospective memory and time management is still a recent field of investigation and few are the contributions in the literature that have investigated explicitly this relationship. Most of these contributions are theoretical works that have established a link between memory and time management, but exists limited empirical evidence.

In this direction are certainly the contribution of the meta-analysis by Francis-Smythe (2006) and empirical contribution offered by Macan and colleagues (2010).

The purpose of the proposed contribution by Macan and colleagues was based on the assumption that individuals with good memory skills prospective and retrospective would have to bring good skills of TM and, in contrast, those more prone to failures in prospective memory abilities should have shown the worst of TM. The study was based on a correlational approach. Subjects were given two of the most common tools for measuring the behaviour of Time Management (TMBS: Macan et al., 1990, and TSQ: Bond and Feather, 1983) together with the PRMQ (Smith et al., 2000) that investigates the prospective and retrospective memory processes. The results confirmed in part the initial hypothesis by showing the existence of a strong relationship between TM and the specific aspects of prospective memory, especially as regards the set goals and priorities and have a preference for an organized approach to projects and work environment.

The Francis-Smythe work was among the first to explicitly address the relationship between TM and PM. The author has shown, in fact, the strategies commonly are used to support the PM (e.g., business planning, prioritizing tasks, notes, to-do list) are the same used for time management. In his work, the author has presented the different aspects of the construct of TM focusing on how they can contribute to the knowledge of this relationship. For example, the most obvious commonality between the two constructs is the use of external support (alerts, logs, etc.) used to avoid anxiety or stressful situations that might arise in the management of daily activities. The author also took into account factors that may influence the use of techniques of TM as a strategy against the failures of the PM. For example, fundamental was the ability to accurately estimate the time: a good time management would require, in

fact, the ability to plan a program to follow that estimate in advance the time required to perform each activity. Similarly with regard to PM, remember to do something at the right time requires the same degree of estimation and monitoring of the time.

Based on these theoretical assumptions, the purpose of this study was to provide further evidence about the relationship between prospective memory and time management. We hypothesized that people with good prospective and retrospective memory would also report good time management skills, and conversely, those with more memory failures would report poorer time management skills.

Method

Participants. Three hundred and twenty-one participants (mean age=28,9; SD=8,9) volunteered in this study. Ninety-four were males (mean age=30,7; SD=9,9) and 227 were females (mean age=28,1; SD=8,4)

Materials and procedure. In order to assess the variables considered, all subjects filled out the following questionnaire:

- The Italian version of Time Management Behaviours Scale (Coletta et al, 2010). This questionnaire (thirty-four item, 5-point Likert scale) measures the time management behaviours through four dimensions: Setting goals and priorities (that indicate the setting of goals the person wants or needs to accomplish and prioritizing of the various tasks to achieve these goals), Mechanics of time management (refers to the behaviours typically associated with managing time, such as making lists and planning), Perceived control of time (referred to the extent to which one believes he or she can affect how time is spent) and Preference for organization (referred to a general preference for disorganization in one's workspace and approach to projects)

- The Behavioural Markers of Personal Productivity (BMPP) created in the previous study (see Study 5). This questionnaire (forty-nine item, 5-point Likert-type scale) identifies the behavioural markers of personal productivity through four dimensions: Control, Use of paper and pencil tools, Planning and Use of digital tools

- The Italian version of Prospective and Retrospective Memory Questionnaire (Smith et al., 2000; PRMQ). This questionnaire was developed to provide a self-report measure of prospective and retrospective memory slips in everyday life. It consists of sixteen items (5-point Likert-type scale, from "Never" to "Very often", eight asking about prospective memory failures, and eight concerning retrospective failures).

Data analysis and results.

The items composing each scale were summed. The overall TMBS, PRMQ and BMPP score is a sum of all their items.

Reliability. Coefficient alphas were computed for all scales and can be found in Table 9. The coefficient indicates respectable internal consistency across the measures, ranging from .62 to .87. Only the dimension "Use of digital tools" of BMPP showed values less than r=0.6. However, considering that this dimension is composed of only seven items it is believed that this result has no implications for the following analysis.

	Cronbach's Alpha
TMBS overall	.71
Setting goals and priorities	.78
Mechanics of time management	.75
Preference for organization	.65
Perceived control of time	.62
PRMQ overall	.89
Prospective memory	.85
Retrospective memory	.74
BMPP overall	.79
Control	.86
Use of paper and pencil tools	.73
Planning	.72
Use of digital tools	.56

Tab.9 – TMBS, PRMQ and BMPP reliability statistics

Correlation. Table 10 shows the correlations among the measures and their dimensions.

Two of four TMBS dimensions, Preference for organization and Perceived control of time, correlated with the prospective memory component as expected. Who reported better prospective memory as measured by PRMQ scales also indicated that they were more likely to prefer an organized approach to projects (r=.30) and a greater perceptions of control over their time (r=.37). On the other hand, the mechanics of time management dimension, which captures time management strategies such as making lists, showed no correlations with prospective memory (r=.15). Additionally, prospective memory showed a correlation with Control BMPP dimension (r=.61), indicating as who reported a better prospective memory also indicated that they were more likely to better control of their activities.

For the retrospective measures, we found small moderate significant correlations with Preference for organization (r=.27) and Perceived control of time (r=.31). In general, findings suggest both mechanisms of memory are important and related to time management. Additionally, as well as for the Prospective memory, Retrospective memory showed a high correlation with Control BMPP dimension (r=.51). Perhaps remembering the past to keep track of what they did is essential for better control their activities and to be effective.

		1	2	3	4	5	6	7	8	9	10	11	12	13
1. Setting goals and priorities	Pearson Correlation	1	.448**	-.226**	-.223**	.753**	-.115*	-,083	-.139*	-.153**	.346**	.564**	.250**	.337**
	Sig. (2-tailed)		,000	,000	,000	,000	,040	,138	,013	,006	,000	,000	,000	,000
2. Mechanisc of time management	Pearson Correlation		1	-.178**	-.150**	.704**	.119*	.148**	,069	-,006	.814**	.478**	.344**	.634**
	Sig. (2-tailed)			,001	,007	,000	,033	,008	,217	,911	,000	,000	,000	,000
3. Preferences for organization	Pearson Correlation			1	.489**	.164**	.303**	.300**	.270**	.555**	-.126*	-.306**	-,057	.169**
	Sig. (2-tailed)				,000	,003	,000	,000	,000	,000	,024	,000	,307	,002
4. Perceived control of time	Pearson Correlation				1	.148**	.361**	.368**	.307**	.486**	-.126*	-.317**	,001	.134*
	Sig. (2-tailed)					,008	,000	,000	,000	,000	,024	,000	,990	,016
5. TMBS overall	Pearson Correlation					1	.202**	.236**	.136*	.166**	.564**	.489**	.331**	.633**
	Sig. (2-tailed)						,000	,000	,015	,003	,000	,000	,000	,000
6. PRMQ overall	Pearson Correlation						1	.954**	.931**	.597**	.139*	-.142*	-,036	.384**
	Sig. (2-tailed)							,000	,000	,000	,013	,011	,515	,000
7. Prospective memory	Pearson Correlation							1	.778**	.607**	.170**	-.133*	-,037	.408**
	Sig. (2-tailed)								,000	,000	,002	,017	,511	,000
8. Retrospective meory	Pearson Correlation								1	.510**	,084	-.136*	-,031	.306**
	Sig. (2-tailed)									,000	,133	,015	,574	,000
9. Control	Pearson Correlation									1	,100	-.302**	-,078	.554**
	Sig. (2-tailed)										,074	,000	,165	,000
10. Use of per and pencil tools	Pearson Correlation										1	.428**	.339**	.767**
	Sig. (2-tailed)											,000	,000	,000
11.Planning	Pearson Correlation											1	.313**	.462**
	Sig. (2-tailed)												,000	,000
12. Use of digital tools	Pearson Correlation												1	.474**
	Sig. (2-tailed)													,000
13. BMPP overall	Pearson Correlation													1
	Sig. (2-tailed)													

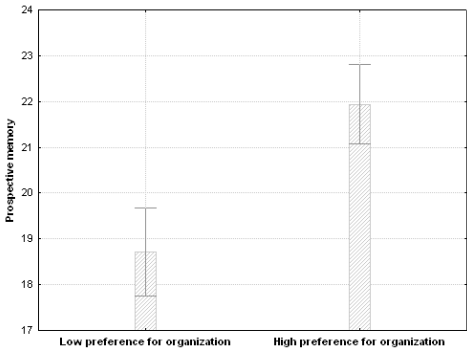
**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Tab.10 – Correlation between TMBS, PRMQ and BMPP

Anova. Based on these results, four separated ANOVA are made using as fixed factor the "high" and "low" categories of Preference for organization and Perceived control of time TMBS dimensions and Control BMPP dimension and as dependent variable Prospective and Retrospective memory measured by PRMQ questionnaire. Results confirmed those correlational (see fig 19, 20, 21 and 22).

F(1,319)=24,213, p<.00



F(1,319)=20,166, p<.00

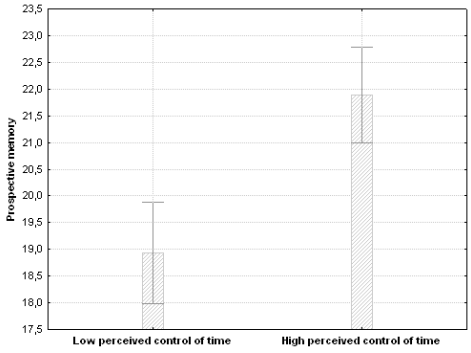
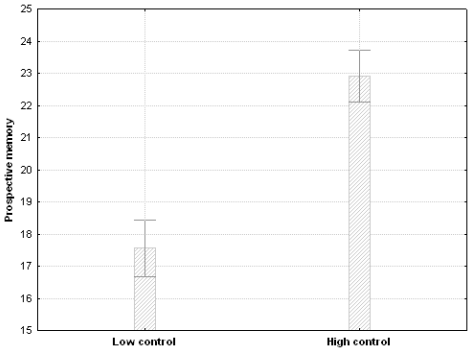


Fig. 19-20 – Scores in Prospective memory separately for high/low Preference for organization and Perceived control of time TMBS dimensions

F(1,319)=77,117, p<.00



F(1,319)=56,232, p<.00

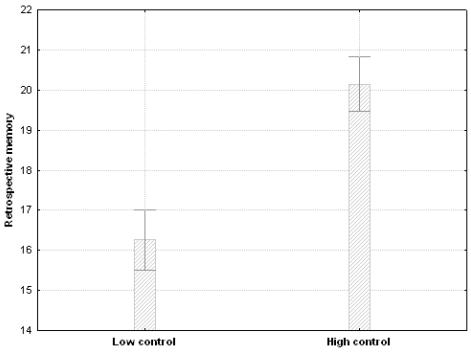


Fig. 21 and 22 – Scores in Prospective memory separately for high/low Preference for organization and Perceived control of time TMBS dimensions

Discussion and conclusions

Our results showed significant relationship between time management and memory. Specifically, the memory for future events (prospective memory) and past events (retrospective memory) was positively related to time management behaviours preferring an organized approach to projects and having a greater

perception of control over own time. Additionally, these two memory functions were also positively related to Control dimension of BMPP, indicating as having a better control of own activities requires a good prospective but is needed also to keep track of past events.

These results replicated which obtained by Macan and colleagues (Macan et al., 2010) almost completely, except for the “Setting goals and priorities” dimension. In our study, in fact, no significant correlations were appeared between this dimension and prospective and retrospective memory.

Our findings of a relation between time management and memory are encouraging and support the recent line of research in this field of study although they have some limitations. First, this study, as well as Macan and colleagues (2010), is correlational and causality cannot be determined: best memory skills ensure better management of activities, or the use of effective strategies for managing tasks makes individuals less likely to fail in tasks of prospective memory? Furthermore, it should be noted that the memory and time management skills are in this case self-reported by the subjects and were not detected in tasks actually carried out.

Nevertheless, the tool proposed here for the detection of behaviours that people adopt to manage their assets (and identify observable behaviours that promote or not a good performance), shows as the dimension of the "control" is relevant with respect to the hypothesis formulated.

This is particularly interesting, especially because it was not found a relationship between the use of tools and memory skills (hence the use of active strategies). It’s therefore possible to interpret the result obtained as a proof of the existence of individual differences, presumably related to the dimension temperamental of the attentional control, capable of explaining both the ability of personal organization, both the memory ability (in particular in respect to the prospective memory). The practical implications of this finding, if confirmed by further studies, are quite relevant. In fact, it's a quite common observation that the success of self-management programs seems often more related to individual characteristics than to the nature of the program. If the dimension of the "control" (and by extension the "attentional control") is confirmed as an essential element to ensure a good personal

productivity, efforts to ensure the success of any behavioural program should trend the first instance to identify compensatory strategies for those who are deficient.

GENERAL DISCUSSION

The purpose of the present work was to investigate the role of prospective memory in the management of commitments. Several studies, already cited, showed the existence of a relationship between this construct and time management behaviours that persons put in place for carry out their tasks. In particular, the most evident aspect that these two constructs have in common is the use of external supports for remember to getting things done (in the first case) and the organization of the commitments (in the second).

After analyzed the main contributions present in literature on these two topics, the aim of this dissertation was to provide empirical evidence on this relationship. For this reason, the first step was the adaptation to the Italian language of the Time Management Behaviours scale (Macan et al., 1990). Unlike others questionnaires that employ the individual assessment on the efficiency of TM behaviours, the item of this scale has been developed with the intention to measure how people effectively implement such typology of behaviours. Results showed as the four dimensions solution replicates almost perfectly that original except six items of which four contributes to the "Setting goals and priorities" factor. However, more interesting is the individuation of a solution with three factors, more appropriated and consistent with the recent considerations made by the author of TMBS (Macan, 2004). Considering that this solution showed high reliability score, it would seem more plausible that the TMBS scale measures three factors instead four. The intern consistence of the three dimensions results more satisfying and the exclusion of none item increase the reliability of the dimensions. The absence of the "Perceived control of time" dimension from this factorial solution could be partly justified by the considerations given by Macan: the time management behaviours in itself would not affect the final result but it would operate through the perceived control of their time. Macan (1994) has argued, indeed, that setting goals and priorities, planning and organizing would develop a sense of mastery to manage own time, or the feeling to control it. However, further studies are needed to evaluate the predictive ability compared to the performance.

The second contribution gets into the studies overview existing with the aim to investigate some relationships and implications between time management behaviours and academic productivity. For this purpose we carried out a specific HPDA, loosely inspired to getting things done methodology, where the students had to report theirs activities, incoming information and projects. The results of this study showed as using a Hipster PDA for the student's activities may positively affects academic performance. Particularly, the experimental group obtained a significant improvement (in terms of higher grades) compared to control group, index of efficacy of instrument used. None difference came out between the two groups in respect to TMBS scale. However, the division made in two subgroups ("More/Less" exams and "Organized/Unorganized") were highlighted interesting results: 1) students who carried out more exams during their academic career obtained a higher score in the total TMBS questionnaire in respect to that ones who made a lower number, 2) students considered organized have carried out a higher number of exams and 3) students who have made more exams resulted to be more task-oriented and less avoidant-oriented coping respect to that carried out a lower number of exams previously. Although are needed further deepening, this work is part of knowledge framework quite wide to make comparisons about survey instruments commonly used, the results obtained and to provide hints for future studies on time management and academic productivity.

Based on the results of second study, the third study has deepened the efficacy of contexts use. Unfortunately, results did not confirm the initial assumptions that subjects using a classification for context would have a better chance to complete all actions in good time and adopt a more linear trend in the advancement of the project. Despite the lack of statistical significance, noting the trend of the graph and the data tending to significance, it's could consider the possible validity of this study and of the hypothesis proposed. The probable causes of the lack of significance may be sought to the sample sizes used and to the homogeneity with regard to age and type of employment work. Further researches will try to investigate, with the same methodological and theoretical characteristics, the relationship between actions and contexts using a larger sample composed by persons employed in different positions.

The aim of the fourth study was investigate the relationship between time management and proneness to errors. In particular, it showed as a preference to work in an organized environment and a better perception of time are factors that can facilitate the fulfilment of a smaller number of cognitive errors and, consequently, also to meet the oversights that occur daily in a disorganized workplace or in situations where they assess incorrectly the time in hand. Results statistically supported these hypotheses: behaviours oriented to better manage time and organize and planning work activities are not considered as superfluous. On the contrary, such actions as keeping a diary of activities, taking notes, placing the materials on paper, systematically checking email or creating lists of things to do, take the form of behaviours that increase the time management skills of the individuals, helping to create efficient working environments and increase the individual performance of each impacting negatively on the number cognitive errors that they commit as a result of forgetfulness.

The fifth study aimed to develop a questionnaire capable to identify behavioural markers of personal productivity. Unlike others questionnaires that mainly employ the individual assessment on the efficiency of TM behaviours, this instrument has been developed with the intention to individuate those behaviours actually useful for individuals in managing their tasks and to provide a valid tool for the selection processes, measuring the degree of personal productivity of individuals. Although the results obtained are important, more studies are needed for improve this instrument.

The last study showed significant relationship between time management and memory. Specifically, the memory for future events (prospective memory) and past events (retrospective memory) was positively related to time management behaviours preferring an organized approach to projects and have a greater perception of control over own time. Additionally, these two memory functions were also positively related to Control dimension of BMPP, indicating as having a better control of own activities requires a good prospective but is needed also to keep track of past events. Although the causality of this relationship cannot be determined, the results show as the dimension of the "control" is relevant in respect to the hypothesis formulated. It’s therefore possible to interpret the result obtained as an evidence of

the existence of individual differences, presumably related to the dimension temperamental of the attentional control, able to explain both the ability of personal organization and the memory ability (in particular in respect to the prospective memory). The practical implications of this finding, if confirmed by further studies, are quite relevant: if the dimension of the "control" is confirmed as an essential element to ensure a good personal productivity, the efforts to ensure the success of any behavioural program should trend, the first instance, to identify compensatory strategies for those who are deficient.

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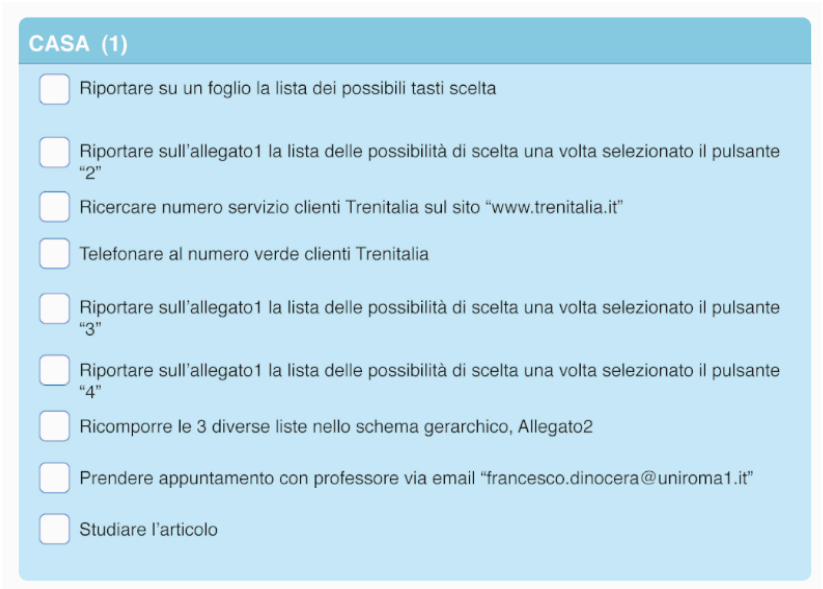
APPENDICES

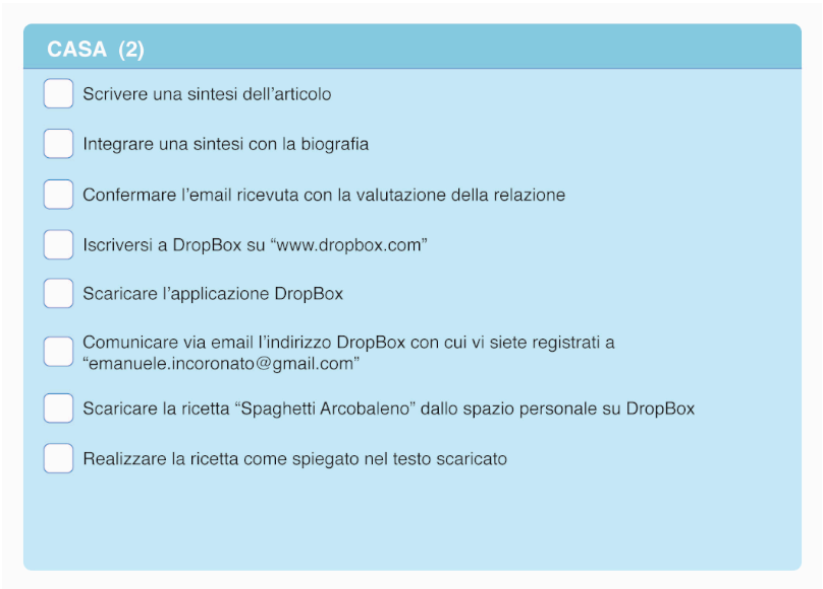
APPENDIX A

Sheets for "Context Group"

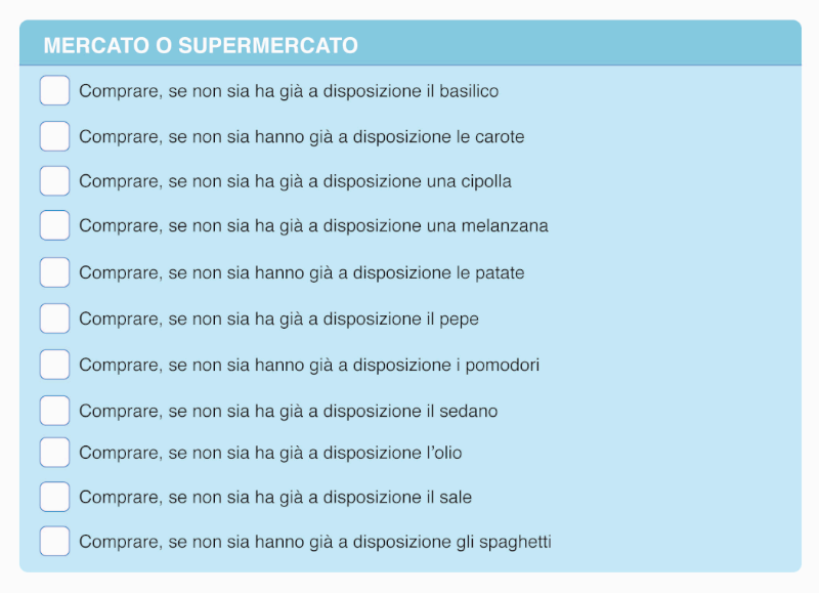
Sheets 1. Context "Home"



Sheet 2. Context "Home"



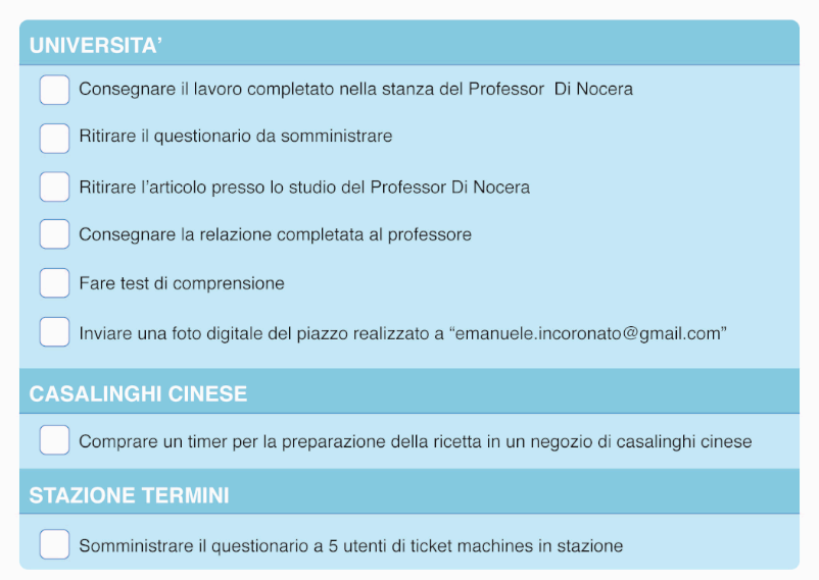
Sheet 3. Context “Market or Supermarket”



MERCATO O SUPERMERCATO

- [ ] Comprare, se non sia ha già a disposizione il basilico
- [ ] Comprare, se non sia hanno già a disposizione le carote
- [ ] Comprare, se non sia ha già a disposizione una cipolla
- [ ] Comprare, se non sia ha già a disposizione una melanzana
- [ ] Comprare, se non sia hanno già a disposizione le patate
- [ ] Comprare, se non sia ha già a disposizione il pepe
- [ ] Comprare, se non sia hanno già a disposizione i pomodori
- [ ] Comprare, se non sia ha già a disposizione il sedano
- [ ] Comprare, se non sia ha già a disposizione l'olio
- [ ] Comprare, se non sia ha già a disposizione il sale
- [ ] Comprare, se non sia hanno già a disposizione gli spaghetti

Sheet 4. Context “University” “Household” and “Termini station”



UNIVERSITA'

- [ ] Consegnare il lavoro completato nella stanza del Professor Di Nocera
- [ ] Ritirare il questionario da somministrare
- [ ] Ritirare l'articolo presso lo studio del Professor Di Nocera
- [ ] Consegnare la relazione completata al professore
- [ ] Fare test di comprensione
- [ ] Inviare una foto digitale del piazzo realizzato a “emanuele.incoronato@gmail.com”

CASALINGHI CINESE

- [ ] Comprare un timer per la preparazione della ricetta in un negozio di casalinghi cinese

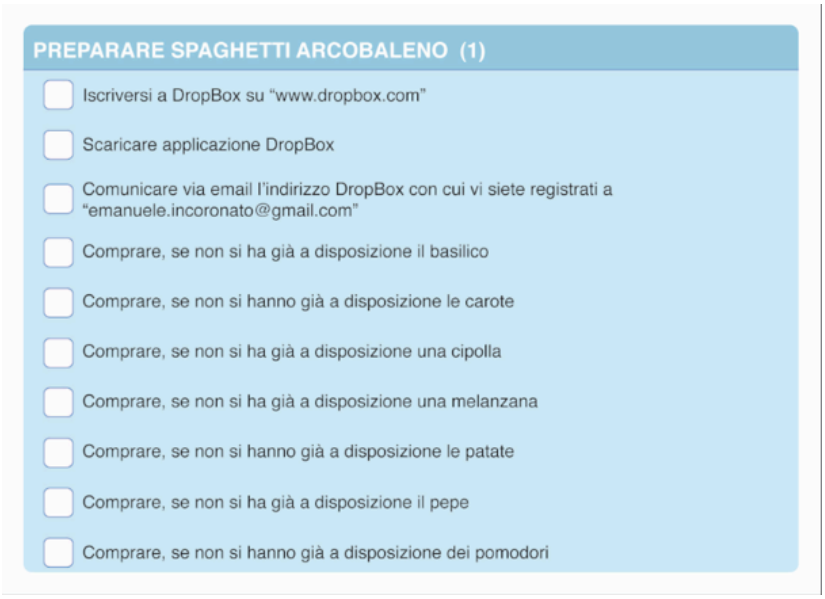
STAZIONE TERMINI

- [ ] Somministrare il questionario a 5 utenti di ticket machines in stazione

APPENDIX B

Sheets for "Project Group"

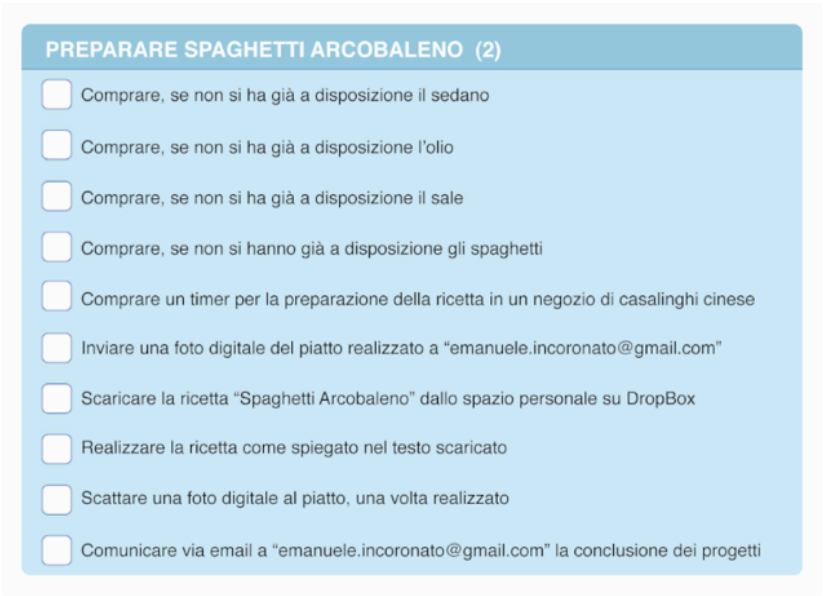
Sheets 5. Project "Prepare noodles rainbow" (1)



PREPARARE SPAGHETTI ARCOBALENO (1)

- [ ] Iscriversi a DropBox su "www.dropbox.com"
- [ ] Scaricare applicazione DropBox
- [ ] Comunicare via email l'indirizzo DropBox con cui vi siete registrati a "emanuele.incoronato@gmail.com"
- [ ] Comprare, se non si ha già a disposizione il basilico
- [ ] Comprare, se non si hanno già a disposizione le carote
- [ ] Comprare, se non si ha già a disposizione una cipolla
- [ ] Comprare, se non si ha già a disposizione una melanzana
- [ ] Comprare, se non si hanno già a disposizione le patate
- [ ] Comprare, se non si ha già a disposizione il pepe
- [ ] Comprare, se non si hanno già a disposizione dei pomodori

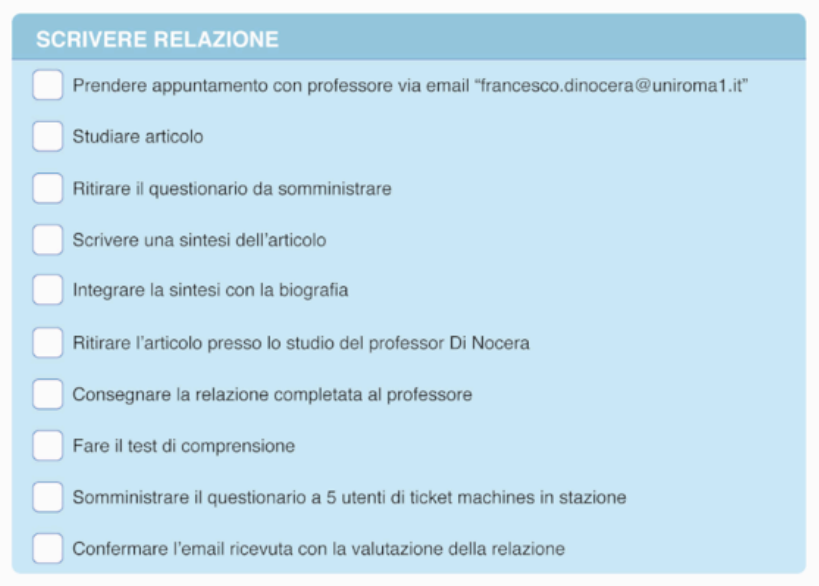
Sheets 6. Project "Prepare noodles rainbow" (2)



PREPARARE SPAGHETTI ARCOBALENO (2)

- [ ] Comprare, se non si ha già a disposizione il sedano
- [ ] Comprare, se non si ha già a disposizione l'olio
- [ ] Comprare, se non si ha già a disposizione il sale
- [ ] Comprare, se non si hanno già a disposizione gli spaghetti
- [ ] Comprare un timer per la preparazione della ricetta in un negozio di casalinghi cinese
- [ ] Inviare una foto digitale del piatto realizzato a "emanuele.incoronato@gmail.com"
- [ ] Scaricare la ricetta "Spaghetti Arcobaleno" dallo spazio personale su DropBox
- [ ] Realizzare la ricetta come spiegato nel testo scaricato
- [ ] Scattare una foto digitale al piatto, una volta realizzato
- [ ] Comunicare via email a "emanuele.incoronato@gmail.com" la conclusione dei progetti

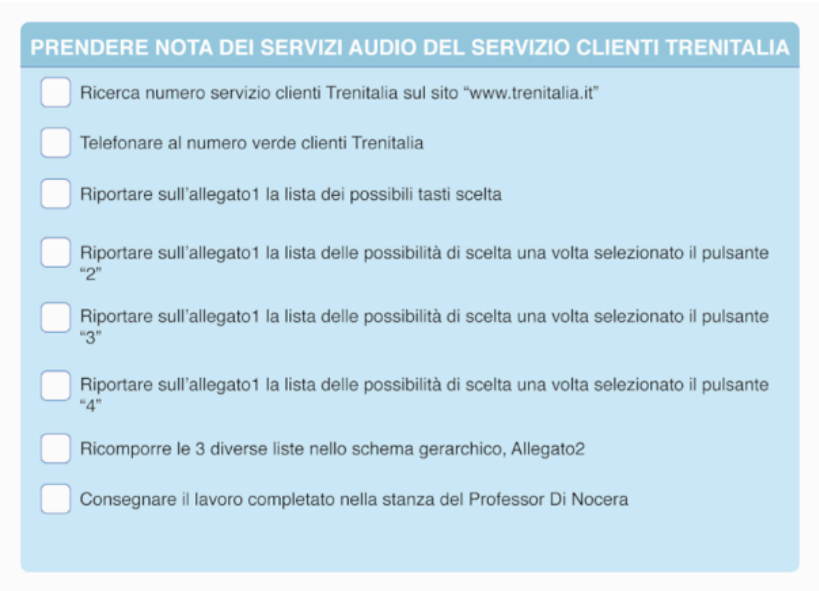
Sheets 7. Project "Write a report"



SCRIVERE RELAZIONE

- [ ] Prendere appuntamento con professore via email "francesco.dinocera@uniroma1.it"
- [ ] Studiare articolo
- [ ] Ritirare il questionario da somministrare
- [ ] Scrivere una sintesi dell'articolo
- [ ] Integrare la sintesi con la biografia
- [ ] Ritirare l'articolo presso lo studio del professor Di Nocera
- [ ] Consegnare la relazione completata al professore
- [ ] Fare il test di comprensione
- [ ] Somministrare il questionario a 5 utenti di ticket machines in stazione
- [ ] Confermare l'email ricevuta con la valutazione della relazione

Sheets 8. "Take note of the audio services of Trenitalia customer service"



PRENDERE NOTA DEI SERVIZI AUDIO DEL SERVIZIO CLIENTI TRENITALIA

- [ ] Ricerca numero servizio clienti Trenitalia sul sito "www.trenitalia.it"
- [ ] Telefonare al numero verde clienti Trenitalia
- [ ] Riportare sull'allegato1 la lista dei possibili tasti scelta
- [ ] Riportare sull'allegato1 la lista delle possibilità di scelta una volta selezionato il pulsante "2"
- [ ] Riportare sull'allegato1 la lista delle possibilità di scelta una volta selezionato il pulsante "3"
- [ ] Riportare sull'allegato1 la lista delle possibilità di scelta una volta selezionato il pulsante "4"
- [ ] Ricomporre le 3 diverse liste nello schema gerarchico, Allegato2
- [ ] Consegnare il lavoro completato nella stanza del Professor Di Nocera